IRON TRADE REVIEW
Registration Applied For
The Authority of Industry National and International
Vol. LXXII Cleveland, March 22, 1923 No. 12

Higher Production Is Promised

Resumption of at Least 15 Additional Blast Furnaces Is Scheduled—More Undertakings Postponed Because of Prolonged Steel Deliveries but New Demands Tax Mills—Prices Are Steadier—Wage Advances Discussed

STILL higher production of iron and steel is promised by the plans for starting additional primary capacity now taking shape. At least 15 additional blast furnaces are scheduled to go in within 30 days if fuel and labor are obtainable. The past week has seen a number of contracts for coke placed at advanced prices against these resumptions. Wage advances continue under discussion in the industry and a 40-cent hourly rate for common labor is mentioned, representing an increase of approximately 11 per cent. While definite decisions have not been made in many cases, it is known some independents will put higher rates in effect April 1.

Greater steadiness of steel prices reflects the conservative attitude of leading producers against a continuation of the rapid advance of the market. The largest maker, however, now is quoting a minimum of 2.35c, Pittsburgh, for plates and shapes, an advance of $2. On galvanized sheets independent mills quote 5.00c, Pittsburgh minimum.

Large negotiations for lake iron are under way and the outlook points to prices being named very shortly though some interests are holding back until the question of a wage advance in the near future is settled. The Ford Motor Co. is inquiring for 300,000 tons of lake ore.

Some Tonnage Postponed

New business still is developing high spots especially in the demand for railroad equipment, oil tankage and other plate work but it is more apparent that deferred delivery on steel is causing an increasing number of undertakings to be set aside for the time being. The Texas Co. has postponed indefinitely a 400-mile pipe line, requiring 40,000 tons because it can get no definite assurance when the material can be had. Some other pipe line projects have been postponed or abandoned. Additional building work has been held up and some fabricators are reporting a slowing down of new inquiry.

These evidences of some restraint on new tonnage are welcome rather than disturbing to many producers because their obligations are so large they have become unwieldy and it is a question how many months it would take to clear the books even at present operations. As it is, the fresh requirements in the market this week are large. Chicago mills for the third consecutive week have broken the record for total tonnage received in such a period this year. The steel bar demand at Pittsburgh is described as the most insistent in over 20 years.

New Demands Large

New contracts for oil tanks this week total 30,000 tons the largest being for 12,000 tons to the American Bridge Co. for Pearl Harbor, Hawaii. New York took bids this week on 15,000 tons of aqueduct work. Bids will be taken soon on the Hetch Hetchy pipe line project on the Pacific Coast requiring 26,000 tons.

February structural awards are officially reported at the rate of 177,000 tons or 80 per cent of shop capacity. Building steel awards reported this week total 27,397 tons.

Pig iron prices have continued to advance with an increasing buying movement for third quarter. Round tonnages of Alabama iron have been sold at $27 Birmingham. Chicago has advanced to $32. Valley foundry, basic, bessemer and malleable are bringing $31. Eastern grades are up $1 further.

IRON TRADE REVIEW composite of fourteen leading iron and steel products is up to a new high basis this week with a figure of $45.33, the highest in two years. Last week the average was $44.95.

Export Trade Mixed

Some peculiar cross-currents are developing in the export market where a heavy inquiry from all parts of the world continues to come to American and British mills. A British interest is inquiring in this country for 5000 tons of plates while a Pittsburgh fabricator has asked prices on a tonnage of small angles from British mills and has quoted $44.05 c.i.f. New York. France has placed 5000 tons additional of American furnace coke. France has been persuaded to release to British shipbuilders 120,000 tons of Ruhr steel contracted for weeks ago.

Business Trend and Chart Section Page 867

Pig Iron Prices Still Advance

Further Increase of $1 Quoted in Various Districts—Southern Iron Established at $27—Buying for Third Quarter Is on the Increase—Foreign Makers Sound Eastern Market Preparatory To Renewed Selling Later

PITTSBURGH, March 20. — Considerable inquiry is current for different grades of pig iron and from time to time sales are being closed so that apparently there is no shortage of iron and consumers are able to buy all they want if they are willing to pay the price. The market is considered firm at a minimum of $31, valley, for all grades, an advance of about $1 per ton in the week. For the most part producers are unwilling to name a definite figure on the 10,000 tons of basic which was asked by Follansbee Bros. Co. for delivery June to September and if this tonnage is bought, it probably will be on the basis of quotations appearing in IRON TRADE REVIEW and other trade journals at time of delivery. Basic sales of 2000 tons and 3000 tons respectively to the Sharon Steel Hoop Co. and a sheetmaker on the Ohio river for April delivery were closed last week but $31 now is the minimum quotation available. This is substantiated by a few sales involving smaller tonnages in this district and lots of from 1000 to 2000 tons each in Ohio territory. In fact, some offers from buyers of $31, valley, have been turned down by valley producers. In bessemer, one order for more than 1000 tons from a nearby melter was taken at $31, valley. The Mesta Machine Co. paid that for a portion of its inquiry for 1200 tons recently issued. This week it is asking for 1000 tons additional for delivery during July; $31.50, valley, is quoted. The Union Steel Casting Co. has deferred action on its inquiry for 1000 tons of this grade. Malleable, too, is quoted at a $31 minimum, that price being named on an inquiry for 3000 tons put out by middle interests here. The Standard Sanitary Mfg. Co. has purchased 5000 tons of No. 2 southern foundry iron for third quarter delivery to its Louisville, Ky., plant at $27, Birmingham base. Relatively small sales of northern foundry iron for second quarter continue to be closed from time to time, although one inquiry now current calls for 1000 tons. The Mesta Machine Co. is understood to have closed for 500 tons of No. 2, 900 tons of No. 3 and 600 tons of No. 2 special with phosphorus content of 0.70 to 1.00 per cent on the basis of $31 for No. 2 (1.75 to 2.25 silicon). Regular $1 silicon differentials are being quoted in this district. Some small lots of foundry have been sold by middle interests as high as $32, valley. Most of the foundry iron sellers have taken contracts from their regular customers to the full extent of their output and are out of the market or substantially so. Occasional small lots of low phosphorus copper-free iron are being booked at $35 to $36, valley.

Buy for Third Quarter

Boston, March 20.—Rapidly advancing pig iron prices in the New England market have caused consumers to cover for third quarter delivery. Sales during the week for this delivery have been heavier than at any time so far this year. Reluctance, however, is apparent on the part of consumers, as well as furnaces, to contract for tonnage for fourth quarter. Prices have gone up about $1 in nearly all eastern producing districts during the week. Two of the principal Virginia interests advanced to $29 furnace or $34.92 delivered for the base grade with 50 cent differentials. Northern furnaces are quoting slightly under this delivered figure for the base grade, but higher differentials in the North make the Virginia irons low on the high silicon grades. At least four 1000-ton orders have recently been placed within the district and many sales of from 300 to 500 tons for third quarter delivery are reported. Inquiry is active, one dealer stating he had 5000 tons on hand. Some inquiry comes from France and Belgium and it is interesting to note import iron in storage on this side now could be returned to Europe at a profit.

Extended Statistics of American Iron and Steel Production and Ingot and Casting Output, page 912

Heavy Buying at New York

New York, March 20.—Heavy buying continues to feature the pig iron market. Known sales during the past week in this territory aggregate 41,000 tons or more. New inquiries aggregate fully 15,000 tons. A notable feature of the current inquiry is that it includes third quarter requirements of at least two large consumers who are regarded as among the keenest buyers in this territory. The market now is at least $1 higher than a week ago. Most eastern makers now have a minimum price of $31 furnace base, plus $1 silicon differentials and some of the past week's business has gone at this level. The $30 base price has not yet entirely disappeared but is exceptional. On Buffalo iron $29.50 base furnace now is exceptional and the usual minimum is $30 base Buffalo. On Central Pennsylvania foundry the minimum is $29 base furnace, plus 50-cent differentials, although at least two central Pennsylvania makers are at $30 minimum and at least one of these makers is asking $1 silicon differentials. Three of the Virgina makers now are at $29 base furnace and two of them are asking $1 silicon differentials. A fourth Virgina maker which is an active seller and is able to make good deliveries now is at $28 base furnace, minimum, plus 50-cent silicon differentials. Eastern Pennsylvania malleable has been sold during the past week at $31 furnace. Buffalo malleable has been sold at $30 furnace for eastern shipment. Domestic copper-free low phosphorus iron continues at $32 furnace minimum. Considerable inquiry still continues to be received for pig iron for Europe. So far prices have been too high to admit of the sale of much American iron in Europe. On the assumption that the Ruhr situation will be adjusted shortly some of European pig iron producers, therefore, are looking over the situation here with a view to making arrangements to sell pig iron here They believe that except for periods of emergency, such as at present they normally will be able to compete for pig iron business along the Atlantic seaboard.

Inquiring for Third Quarter

Buffalo, March 20.—Some inquiry for pig iron is coming out for third quarter and some selling has taken place on a $30 base, Buffalo. This price is now the going one for second quarter delivery with $30.50 for No. 2X, (2.25 to 2.75 silicon) and $31 for No. 1X, (2.75 to 3.25 silicon.) Current inquiry calls for 20,000 to 25,000 tons for malleable and foundry. A locomotive builder is seeking 2500 tons, and a 10,000 ton of basic inquiry from outside district, has been received. Of 25,000 tons sold, one interest reports separate sales of 4000 and 5000 respectively. This iron was sold on a $29.50 basis, but the furnace has since gone to $30 base. Malleable is quoted at $30.50 and one furnace is asking $31.50 for No. 1X, (2.75 to 3.25 silicon.) A second furnace interest sold an aggregate of 5000 tons.

More Sales For Third Quarter

Cleveland, March 20.—A growing tendency is shown among the northern Ohio group of furnace interests to figure on pig iron tonnages for the third quarter, and around 20,000 tons for that delivery is under negotiation. Large buyers are sounding out the market and some sellers are beginning early to acquire good backlogs for that period. One interest last week booked 10,000 to 15,000 tons additional for the third quarter and another 10,000 tons, in lots up to 5000 tons. Local furnaces are out of the market.

The strength of the market is maintained, but there does not appear to have been any general advance in prices during the past week. Michigan melters in some cases are paying as high as $34.50 for emergency tonnages delivered from outside their regular sources of supply. A lake furnace selling into that territory has supplied some small tonnages at $32, furnace, but is practically sold up. A Cleveland consumer has paid the valley price of $31 on 1000 tons of foundry iron, plus $1.77 freight, and other lots have been closed on this basis. Southern iron also is being called for by Cleveland melters, and about a dozen small lots have been closed booked at $27, base, Birmingham, or $33.01 delivered. A Cleveland foundry tried for $26.50 on a good tonnage and found

that it could not obtain less than $27.

On third quarter sales last week, current prices prevailed. Some tonnages were sold at $30, Buffalo; $31, valley, and $31, Ironton, while another interest booked iron at $31 to $31.50, lake furnace. A central Ohio melter is inquiring for 5000 tons of foundry iron for delivery starting in May and running into the third quarter; another inquiry is pending for 3000 tons of foundry iron for the third quarter.

Follansbee Bros. Co. is inquiring here for 10,000 tons of basic for June-September. A northern Ohio maker last week booked 5000 tons of basic at $31, valley, for a central Ohio steelmaker, and the same buyer has been in the market for a very large tonnage for the second quarter. An alloy steel manufacturer is reported in the market for around 15,000 tons. Some sellers are asking $32, valley.

Chicago Price Now $32

Chicago, March 20.—Northern iron has been advanced $1 to $32, furnace, with heavy demand reaching into third quarter. Silicon is now quoted $1 extra for each 50 points. There are no furnace stocks and iron is scarce. Inquiry is slightly less as most of the large users have covered for the second quarter, although they will need more at their present rate of melt. Some spot inquiry is pending to fill out March needs, and many requests are being made to anticipate shipments. An occasional inquiry is received for the third quarter and some small tonnages have been contracted for at the users' request. This is especially true of malleable. The second Mayville, Wis., furnace will be blown in the last week of March, with most of its second quarter iron sold. An Indiana melter is asking for 5000 to 10,000 tons of second and third quarter foundry iron. An automotive manufacturer is inquiring for 500 tons each of foundry and charcoal iron for the second quarter. An Indiana melter has taken 300 tons of foundry iron. A Milwaukee consumer has taken 700 tons of malleable for the third quarter, and 400 tons of malleable has been sold to another user for the third quarter. Southern iron is on a basis of $27, Birmingham. Valley iron is selling into Michigan, and some Virginia iron is coming close to Chicago. Lake Superior charcoal iron has advanced $1 to $33 base or $36.15 delivered Chicago. Heavy inquiry and sales are reported. Silveries are quiet here. It is understood some makers are sold full for the second quarter and now have advanced $1 to $38.50 for 8 per cent. Low phosphorus iron is $41, delivered.

Southern Sells at $27

Cincinnati, O., March 21.—Recent advances of southern and northern iron seem to have affected buying, as sales during the past week were not as heavy as for the past fortnight. However, the market continues firm, with the southern Ohio iron ranging from $31 to $32, Ironton base, and little business being done at the latter quotation. The southern market is strong at $27, Birmingham base. Delivery of pig iron has not been steady lately for the reason that railroad cars are not being supplied furnaces as liberally. Sales during the week include 5000 tons of southern to the Standard Sanitary Mfg. Co., for Louisville, Ky., for third quarter at $27 Birmingham; 1000 tons of Virginia

(Continued on Page 784)

Coke Buying Restricted

Sizable Sales of Furnace Fuel Not Developing as Expected—Contracts Are Booked at High Level of $7.75—Export Inquiries Pending

COKE PRICES, PAGE 846

Pittsburgh, March 20.—While sizable buying of Connellsville beehive coke for export has not devoloped to the full extent expected, several small cargoes continue to be sold from time to time. These involve 1500 to 5000 tons and have served to strengthen the market price of furnace fuel. Included among two or three inquiries now current for export coke is one which calls for several successive cargoes of about 5000 tons each. On some of these inquiries as high as $7.75 and $8 is quoted and these figures applied in connection with a few transactions recently consummated for shipment abroad. Because of various export regulations shippers are asking 25 or 50 cents per ton more for export coke than at present is available in the spot domestice market. Offers of coke to domestic users are being made here today at $7.50 and 7.65. Several contracts have been taken, however, for the second quarter at $7.75 which sets a new high level in the contract market. Most blast furnaces covered at $7.25 and $7.50. One of the latest purchases at $7.25 was a tonnage for the Rebecca furnace of the Kitanning Iron & Steel Co. which went into blast last Sunday night. The Stewart Furnace Co. also purchased coke recently and will start its furnace about April 15 instead of May 1. The list of $7.75 transactions includes three contracts taken in the past week by a Uniontown, Pa. interest aggregating 22,000 tons monthly for the second quarter. The McKeefrey Iron Co., Leetonia, O. has issued an inquiry for coke for its blast furnace which will blow in about April 1. The Youngstown Sheet & Tube Co. has been paying the spot market price from time to time. The Republic Iron & Steel Co. is understood to have closed on a tonnage for extended delivery to its Atlantic furnace at New Castle, Pa. The Bethlehem Steel Co. has reissued an inquiry this week for 15,000 tons monthly for the second quarter. Medium and high sulphur coke are being offered here in lots up to 20 carloads at the maximum of $6. Some standard selected 72-hour fuel still is available at $8.25 and $8.50. Certain brands, however, still bring $8.75 and $9, so that the full spread of the foundry coke market is $8.25 to $9. Production according to the Connellsville *Courier* for the week ended March 10 was 280,530 tons as against 278,330 tons of the preceding week.

Sell 5000 Tons to France

New York, March 20.—Another sale of 5000 tons of furnace coke for shipment to France has been made during the past week. Some additional inquiries have been quoted on it but owing to the advancing ocean freight rates and the high prices quoted by American producers, no additional transactions have been concluded. French consumers are inclined to postpone further purchases, since they believe that an early settlement of the Ruhr situation will be effected. The last quotation on furnace coke for France was $7.50, Connellsville. Reports as to the extent of this foreign business appear to have been exaggerated. The total of sales to France and Germany over the past three weeks probably did not exceed 40,000 to 50,000 tons. Despite the fact that the Connellsville district is producing heavily, there is no tendency toward an easier supply of coke. Sentiment among producers is stronger.

Demand Continues Strong

Boston, March 20.—Demand for foundry coke is far from being satisfied. Cars are scarce and shipments delayed. Due to cold weather the domestic demand for coke has held up beyond expectations. Barge shipments of beehive coke to Connecticut cities are reported. The by-product price is unchanged at $15 to $16, delivered.

Negotiating With Europe

Birmingham, Ala., March 19.—Coke quotations are firmer. Sales were made during the past few days at $8.50 for the foundry grade, while a spot order or two brought $9. Contracts are not sought by producers. Negotiations have been started for more exports to Europe. The Birmingham district has been called on for coke for shipment to Germany. A lot of 15,000 tons has been sold for shipment through the port of Pensacola to Rotterdam, there to be distrubuted. Inquiries were numerous last week from London agencies for coal and coke but only a small proportion of the coke business was accepted.

Transportation Unsatisfactory

St. Louis, March 19.—Foundry coke continues scarce and prices are steady, premiums being paid occasionaly for prompt delivery. Inquiries from the West and Southwest indicate a shortage. Transportation service from eastern and southern producing points is unsatisfactory. Increased inquiry from Iowa and Nebraska points is a feature of the market. Local by-product ovens continue to operate at capacity, and are shipping their current output.

Demand Better; Prices Stronger

Cincinnati, March 20.—The coke market is stronger than a week ago. Demand has improved and there is a heavy movement of foundry and furnace grades. Consumers are unwilling to contract for fuel at present quotations. Prices have advanced only slightly but are very firm, and additional increases are anticipated. The largest inquiry is from the John A. Savage Co. for approximately 12,000 tons for its Hamilton, O., furnace. Wise county coke is in good demand for spot shipment, while the Connellsville situation is firmer especially for foundry fuel. By-product ovens will have little free coke to offer next month as production today is about on a par with demand.

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products, Yesterday, One Week, One Month, Three Months, One Year and Nine Years Ago

March 21, 1923	March 14, 1923	February, 1923	December, 1922	March, 1922	March, 1914
$45.33	$44.95	$42.61	$40.53	$32.97	$23.60

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

SCRAP PRICES, PAGE 910, WAREHOUSE PAGE 902, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 906

Iron and Steel Prices

Pig Iron

Bessemer, valley	$31.00
Bessemer, Pittsburgh	32.77
Basic, valley	31.00
Basic, Pittsburgh	32.77
Basic, Buffalo	29.50 to 30.00
Basic, del., eastern Pa.	30.00 to 30.50
Malleable, valley	31.00
Malleable, Pittsburgh	32.77
Malleable, Chicago	31.00 to 32.00
Malleable, Buffalo	30.50
Malleable, del., eastern Pa.	32.00 to 33.50

POUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.23
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	34.01 to 35.26
No. 1X, Buffalo	31.00 to 31.50
No. 2 foundry, valley	31.00 to 32.00
No. 2 foundry, Pittsburgh	32.77 to 33.77
No. 2 foundry, Buffalo	30.00
No. 2 foundry, Chicago	31.00 to 32.00
No. 2 foundry, Granite City	31.50 to 32.50
No. 2 foundry, Ironton fur.	31.00 to 32.00
No. 2 foundry, Cleveland del.	32.77 to 33.00
No. 2 foundry, del. Phila.	32.01 to 32.76
No. 2 foundry, N. J. tidewater	32.13 to 33.28
No. 2X, eastern del., Phila.	33.01 to 33.76
No. 2X, east. N. J., tidewater	33.13 to 33.78
No. 2X, eastern del., Boston.	34.15 to 35.15
No. 2X, foundry, Buffalo fur.	30.50
No. 2X, Buffalo, del. Boston.	34.91 to 35.91
No. 2 southern, Birmingham	27.00
No. 2 southern, Cincinnati	31.05
No. 2 southern, Chicago	33.01
No. 2 southern, Philadelphia	33.80
No. 2 southern, Cleveland	33.01
No. 2 southern, Boston (rail)	36.61
No. 2 southern, St. Louis	32.17
No. 2X, Virginia furnace	28.50 to 30.00
No. 2X, Virginia Phila.	33.67 to 35.17
No. 2X, Virginia Jersey City	34.04 to 35.54
No. 2X, Virginia Boston	34.91 to 35.91
Gray forge, eastern Pa.	29.50 to 31.00
Gray forge, val., del. Pitts.	31.77
Low phos., standard, valley	35.00 to 36.00
Low phos., standard, Phila.	37.00
Low phos., Lebanon furnace	32.00
†Low phos. British tidewater	36.50
Charcoal, Birmingham	34.00 to 35.00
Charcoal, Superior, Chicago	35.15

Silvery Iron
Jackson County Ohio, furnace

8 to 9 per cent	$38.50
9 to 10 per cent	40.50
10 to 11 per cent	42.50
11 to 12 per cent	45.50
12 per cent	47.50
13 per cent	50.00

Bessemer Ferrosilicon
Jackson County, Ohio, furnace

10 to 11 per cent	$47.50
11 to 12 per cent	50.80

Ferroalloys

Ferromanganese, 78 to 82 per cent domestic, seaboard	$115.00 to $125.00
Ferromanganese, delivered, Pittsburgh	119.79 to 129.79
†Ferromanganese, 79 per cent, English, c.i.f. seaboard	115.00
Spiegel 19 to 21 per cent furnace	39.00 to 40.00
Ferrosilicon, 50 per cent contract freight allowed	92.50
Ferrotungsten, standard, per pound contained	85.00 to 90.00
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon per pound contained, delivered	12.00
Imported ferrochrome, 4 to 6 per cent carbon	12.00
Ferrovanadium, 30 to 40 per cent per pound estimated, according ton analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producers plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Connellsville furnace	$7.50 to 8.00
Connellsville foundry	8.25 to 9.00
Pocahontas furnace	nominal
Pocahontas foundry	nominal
New River furnace	9.50 to 10.00
New River foundry	11.50 to 12.50
Wise county furnace	7.25 to 8.00
Wise county foundry	8.50 to 9.50
Alabama furnace	7.00 to 7.50
Alabama foundry	7.50 to 8.50

By-Product

Foundry, Newark, N. J., del.	$12.84 to 12.91
Foundry, Chicago, ovens	15.00
Foundry, Boston, delivered	16.00
Foundry, Granite City, Ill.	14.00
Foundry, Alabama	8.00 to 8.50

Semifinished Material

BILLETS AND BLOOMS
(4 x 4-inch)

Open-hearth, Pittsburgh	$42.50 to 45.00
Open-hearth, Youngstown	42.50 to 45.00
Open hearth, Philadelphia	48.67 to 50.17
Bessemer, Pittsburgh	42.50 to 45.00
Bessemer, Youngstown	42.50 to 45.00
Open hearth, Pittsburgh	42.50 to 45.00
Forging, Pittsburgh	50.00 to 52.50
Forging, Philadelphia	55.17 to 58.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50 to 45.00
Open-hearth, Youngstown	42.50 to 45.00
Bessemer, Pittsburgh	42.50 to 45.00
Bessemer, Youngstown	42.50 to 45.00

SLABS

Pittsburgh	$42.50 to 45.00
Youngstown	42.50 to 45.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$47.00 to 50.00
Grooved skelp, Pittsburgh	2.50c to 3.00c
Universal skelp, Pittsburgh	2.50c to 3.00c
Sheared skelp, Pittsburgh	2.50c to 3.00c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.35c to 2.65c
Structural shapes, Phila.	2.675c to 2.975c
Structural shapes, New York	2.69c to 2.99c
Structural shapes, Chicago	2.40c to 2.45c
Tank plates, Pittsburgh	2.35c to 2.65c
Tank plates, Philadelphia	2.675c to 3.075c
Tank plates, New York	2.69c to 3.09c
Tank plates, Chicago	2.45c to 2.50c
Bars, soft steel, Pittsburgh	2.25c to 2.50c
Bars, soft steel, Philadelphia	2.575c to 2.825c
Bars, soft steel, New York	2.59c to 2.84c
Bars, soft steel, Chicago	2.30c to 2.35c
Bars, refined iron, Pittsburgh	3.00c to 4.75c
Bars, rail steel, Chicago	2.30c
Reinforcing bars, Pittsburgh	2.25c to 2.50c
Bar iron, common, Phila.	2.725c to 2.825c
Bar iron, common, New York	2.74c to 2.84c
Bar iron, common, Chicago	2.50c

Hoops, Bands, Shafting

Hoops, Pittsburgh, large	3.05c to 3.30c
Hoops, Pittsburgh, small	3.40c to 3.60c
Bands, Pittsburgh	3.05c to 3.30c
Cold finished steel bars, Pittsburgh base	2.80c
Steel shafting	2.80c

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 37.50
Relaying rails, Pittsburgh	28.00 to 32.00
Light rails, 25 to 45, mill	2.15c to 2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.15c
Spikes, small railroad, Pitts.	3.75c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.15c
Track bolts, Pittsburgh	4.00c to 5.50c
Track bolts, Chicago	4.15c
Tie plates, Pittsburgh	2.60c to 2.75c
Tie plates, Chicago	2.60c

Wire Products

100 lbs. to Jobbers in Carloads

Wire nails, Pittsburgh	2.90c to 3.00c
Plain wire, Pittsburgh	2.65c to 2.75c
Annealed wire, Pittsburgh	2.80c to 2.95c
Galvanized wire, No. 9 gage, Pittsburgh	3.25c to 3.35c
Barbed wire, painted, Pitts.	3.35c
Barbed wire, galv., Pittsburgh	3.70c
Polished staples, Pittsburgh	3.35c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pitts	2.50c to 2.60c
Woven wire fencing (retailers)	64 off
Woven wire fencing (jobbers)	66⅔ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts	6.25c
Sheet piling base, Pittsburgh	2.30c to 2.70c
Hot rolled strip steel, Pittsburgh stamping quality	3.05c to 3.30c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, base	4.75c to 5.25c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	3.50c to 3.85c
No. 28 bessemer, Pittsburgh	3.50c to 3.85c
No. 28, open-hearth, Phila.	3.825c to 4.175c
No. 28, open-hearth, Chicago	**3.59c to 3.69c**

TIN MILL BLACK

No. 28, open-hearth, Pittsburgh	3.50c to 3.85c
No. 28, open-hearth, Chicago	**3.69c**

GALVANIZED

No. 28, open-hearth, Pitts.	4.60c to 5.15c
No. 28 bessemer, Pittsburgh	4.60c to 5.15c
No. 28, open-hearth, Phila.	4.925c to 5.325c
No. 28, open-hearth, Chicago	**4.64c to 4.69c**

BLUE ANNEALED

No. 10, open-hearth, Pittsburgh	2.65c to 3.25c
No. 10, bessemer, Pittsburgh	2.65c to 3.25c
No. 10, open-hearth, Phila.	2.975c to 3.325c
No. 10, open-hearth, Chicago	**2.84c to 2.89c**

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.00c to 5.50c

Tin Plate

Per 100 lb. box

Tin plate, coke base, Pitts.	$4.95 to $5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	64	52½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Carload Discount 4 Points Larger

Steel, 3¼ to 13 inches, 1 c.	45 off
Charcoal iron, 3¼ to 4½ inches l. c.	11 off
Seamless hot rolled, 3¼ to 4-in. l. c.	1.42 off

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	$57.20 to 57.70
Six-inch and over, Chicago	53.20 to 53.70
Four-inch, Birmingham	50.00 to $1.00
Six-inch and over, Birmingham	46.00 to 47.00
Four-inch, New York	63.30
Six-inch and over, New York	58.30
Three-inch, Birmingham	56.00 to 57.00

Class A pipe is $3 higher than Class B.
Standard fittings, Birmingham, base, $110.00
6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	March 21 1923	Feb. 1923	Dec. 1922	Mar. 1922
PIG IRON				
Bessemer, valley, del., Pitts....	$32.77	29.57	30.27	21.21
Basic valley	31.00	26.10	25.00	19.86
*No. 2 foundry, del. Pittsburgh	32.77	28.77	27.37	20.96
*No. 2 foundry, Chicago.....	32.00	29.75	28.00	20.00
Lake Superior charcoal, Chicago	36.15	33.50	35.40	26.90
Malleable, valley	31.00†	27.25	26.25	19.00
Malleable, Chicago	32.00	29.75	28.00	20.00
*Southern No. 2, Birmingham..	27.00	24.50	22.65	15.25
*Southern Ohio, No. 2, Ironton	31.00	28.40	27.15	19.00
Basic eastern del., eastern Pa..	30.00	28.15	27.40	19.90
**No. 2X, Virginia furnace....	28.50	27.50	27.75	22.50
**No. 2X, eastern del., Phila..	33.01	30.10	28.45	21.24
Gray forge val., del. Pittsburgh	31.77	27.87	27.12	20.96
Ferromanganese, del. Pitts.....	124.79	112.29	104.92	67.82
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh	45.00	39.25	36.75	29.40
Sheet bars, openhearth, Pitts...	45.00	39.25	36.75	29.40
Billets, bessemer, Pittsburgh...	45.00	38.85	36.75	28.30
Billets, open-hearth, Pittsburgh..	45.00	38.50	36.75	28.30
FINISHED MATERIAL				
Steel bars, Pittsburgh.....	2.25	2.15	2.00	1.45
Steel bars, Chicago.....	2.35	2.21	2.00	1.56
Steel bars, Philadelphia.....	2.675	2.525	2.30	1.76

	March 21, 1923	Feb. 1923	Dec. 1922	Mar. 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia.....	$2.725	2.45	2.25	1.76
Iron bars, Chicago mills	2.50	2.46	2.35	1.58
Beams, Pittsburgh	2.35	2.15	1.95	1.45
Beams, Philadelphia	2.825	2.525	2.25	1.76
Beams, Chicago	2.45	2.31	2.10	1.58
Tank plates, Pittsburgh.....	2.35	2.15	1.90	1.45
Tank plates, Philadelphia.....	2.825	2.525	2.25	1.76
Tank plates, Chicago.....	2.45	2.31	2.10	1.58
Sheets, blk., No. 28, Pittsburgh.	3.50	3.35	3.30	3.00
Sheets, blue anl., No. 10, Pitts.	2.65	2.50	2.50	2.25
Sheets, galv., No. 28, Pittsburgh	4.60	4.35	4.35	4.00
Wire nails, Pittsburgh	2.90	2.75	2.70	2.40
COKE				
Connellsville furnace, ovens....	7.50	7.20	6.90	3.25
Connellsville foundry, ovens....	8.25	8.60	7.85	4.05
OLD MATERIAL				
Heavy melting steel, Pittsburgh..	27.50	23.40	20.00	14.95
Heavy melting steel, eastern Pa	26.00	21.20	16.70	13.15
Heavy melting steel, Chicago....	23.50	19.75	17.00	12.05
No. 1 wrought, eastern Pa....	28.50	24.10	18.90	15.60
No. 1 wrought, Chicago.....	23.75	20.50	17.25	12.25
Rails for rolling, Chicago.....	25.50	22.00	18.00	12.85

†This should have been $30 last week. *1.75 to 2.25 silicon. **2.25 to 2.75 silicon

Pig Iron Advances

(*Concluded from Page* 845)

to a southeastern Ohio consumer, 500 tons of Virginia and 600 tons of southern to consumers, all in this immediate territory. A Michigan manufacturer bought 800 tons of southern, while 350 tons of southern Ohio malleable went to Terra Haute, Ind. The volume of inquiries is not large but the American Brake Shoe & Foundry Co. is in the market for 4500 tons of southern for its three southern plants, while the Central Foundry Co. is negotiating for 1000 tons of southern foundry iron. LaFollette and Woodward, both southern furnaces have withdrawn from the market temporarily. Charcoal iron has been advanced $1. Jackson county silveries and bessemer ferrosilicon have gone up $1. They now are on the basis of $38.50 furnace for 8 per cent silveries and $47.50 for 11 to 12 per cent bessemer ferrosilicon.

Substantial Tonnage Closed

Philadelphia, March 20.—While pig iron demand here is not as large as in the New York district, a substantial tonnage was closed during the week. Buyers now are inquiring for third quarter on an increasing scale and prices are advancing. Some tonnage was sold at $29 base furnace, plus $1 silicon differentials, but this price now seems to have disappeared and $30 base has been done for both second and third quarter. Moreover, the usual price is $31 furnace. While at least 2000 tons of foundry iron was sold at $32 base plus $1 for No. 2X and $1.50 for No. 1X, most makers are inclined to ask higher for third quarter than for second quarter. Considerable basic foundry is current but due to the soldup condition of furnaces it is difficult to buy over 2000 tons in one lot. Eastern basis has been sold at $29 eastern furnace, equivalent to $30.35 delivered. This figure is now regarded as the market although small lots were sold at $30 furnace. The Pennsylvania railroad's inquiry for 5000 to 7000 tons of foundry is reported closed. From 1200 to 1500 tons of copper-bearing low phosphorus iron has been sold at a new price of $32 furnace. It is expected the Bethlehem Steel Corp. will blow in a furnace at Lebanon, Pa., shortly on copper-bearing low phosphorus iron. It is reported a substantial tonnage of copper-free low phosphorus iron was sold at $35 New York state furnace. Three Virginia makers now quote $29 base furnace and one has sold on this basis plus $1 silicon differentials. Virginia foundry iron, however, still is selling at $28 base, plus 50 cent differential.

Signs of Shortage Appear

St. Louis, March 19.—While at the moment there is a very decided slowing down in actual purchasing of pig iron, considerable interest is being manifested in third quarter requirements. The volume of inquiry for this position is steadily increasing. For southern iron $30 is being talked, and $34 to $35 is being freely predicted for northern iron.

There are many evidences of a shortage of pig iron, especially for use during the balance of the first half. The demand for low grade iron is especially active just now, which is explained also by the shortage of scrap. Inquiries for all grades are being received by producers and agencies here from points which rarely apply to this market.

Southern iron is quoted at from $26 to $27, the only cheaper iron than that being the barge and rail tonnage at $25 offered by the Sloss-Sheffield company. Northern iron is firm at $31, and the leading local producer is quoting $31.50 to $32.50, f.o.b Granite City. This latter is largely a nominal quotation as the interest making it is sold up except odds and ends. Sales reported include 600 tons of foundry to an Iowa melter for second and third quarter delivery, 500 and 700 ton of low grade to melters in the district, 100 tons to a local stove maker, 500 tons to a jobbing foundry and odd, scattering lots besides, totaling about 3000 tons. There are inquiries for 600 tons of foundry by an Iowa melter, 700 tons of ferromanganese 500 tons of fluorspar, 1000 tons of low grade foundry and 500 tons of basic from a Missouri melter.

Pig Iron Active in South

Birmingham, Ala., March 19.—Pig iron in the South is active, furnace interests willing to sell finding no difficulty in getting business for second and third quarters. One company is offering iron at $27 for No. 2 foundry, for any period, intimating that the last half of the year is included. Sales are numerous but in smaller lots than previously, the average now being from 150 to 450 tons. Two companies are still out of the market entirely, two are selling freely, one will take on business from regular customers while still others are selling only spasmodically. Production is approaching the peak mark rapidly. Some producers believe March will see the top notch reached. The blast furnace of the Alabama Co. was blown in during the past week. Two furnaces reported will be ready for operation next month, one being that of the Tennessee Coal, Iron & Railroad Co. and the other a sixth furnace of the Sloss-Sheffield Steel & Iron Co.

Twenty-seven blast furnaces are in operation in Alabama. The Tennessee Coal, Iron & Railroad Co. is again bringing manganese ore by the Warrior river from the storage plant at Mobile while another cargo is enroute from Brazil. Some ore purchased in Arkansas also is being used in this district. The demand for ferromanganese produced in furnace at bessemer, 12 miles from Birmingham, being steady at the steel mills.

Scrap Holds Its Strength

Prices Continue To Soar Higher as Scarcity of Material Becomes More Apparent—Consumers Confining Orders to Immediate Needs

SCRAP PRICES, PAGE 910

Chicago, March 20.—Buying of heavy melting steel and other open-hearth grades by steel producers here a week ago has cleared the situation considerably and has verified the strength represented in quotations. Practically all large consumers of this class of scrap have covered fairly large tonnages. As a result, sellers are in the market for tonnage to apply on contracts. The market is quiet but firm. Cast grades are in good demand, but buyers are resisting present prices. Rolling mills are busier and are in the market. Practically all classes of consumers are buying and strength is given the local market by demand from the East. Railroad offerings continue below normal. The Rock Island railroad offers 4500 tons and the Wabash railroad 4800 tons.

Cast Grades Soar

Boston, March 20.—Cast scrap has advanced and at present heavy cast is being sold at $25 delivered, and No. 1 machinery at $27 to $28. One Massachusetts consumer bought 500 tons of heavy cast at slightly under $25, delivered, but smaller tonnages cannot be obtained below $25. In eastern Pennsylvania, cast scrap has advanced more rapidly than in New England with a resulting favorable situation. Scrap here is moving to meet the Pennsylvania market, reported close to $29. The Boston Elevated railroad recently has been a heavy seller of scrap and some sales by that producer were reported slightly under prevailing prices. Car wheels were sold at $23.50, while some dealers had previously been paying $24. Railroad malleabie is scarce and demand unsatisfied with prices as high as $28. Heavy melting steel has been stationary at $19 to $20 shipping point on orders for eastern Pennsylvania steel makers. Borings, cotton ties, stove plate, and nearly all other grades are active with prices up 50 cents.

High Prices Quoted

New York, March 20.—Scrap prices have undergone another general advance. Dealers are quoting No. 1 heavy melting steel for eastern consumption at $21 to $21.50, f.o.b. New York, and railroad steel at $22 to $22.50 an advance of $1 in each instance. A similar advance also has been made in steel car axles and railroad wrought, these grades holding at $23 to $24 and $21.50 to $22.50, respectively. Cast scrap, grate bars, machine shop turnings and borings and turnings have been increased 50 cents a ton. A shortage prevails in all grades, with demand heavy.

Prices Reflect Strength

Philadelphia, March 20.—The iron and steel scrap market in eastern Pennsylvania continues strong. The scarcity of material is more apparent and dealers are selling only moderate tonnages, hesitating to sell themselves short. Numerous instances have been noted where dealers have paid $26 for heavy melting steel sold at $25 delivered. The market minimum for melting steel now is considered $26 delivered while ideas of asking price range to $27.50 to $28. In some cases several other grades have been quoted higher than the prices prevailing a week ago.

Scarcity Is Threatening

Buffalo, March 20.—All consumers in the district are in the market for heavy melting steel which has gone to $24.75 to $25.75. A sale of 1000 to 2000 tons of this material now constitutes a large sale, in view of the scarcity of tonnage and the high price. No heavy tonnages are available. Malleable and car wheels are scarce and so is low phosphorus scrap.

Market Unusually Strong

Pittsburgh, March 20.—The scrap market is strong due to a shortage of scrap, coupled with restricted tonnages coming out. Contributing factors are the high prices, around $26 being paid in the east and $28.50 paid in Ohio. A Massillon, O., user bought several thousand tons at $28.50. The highest paid here is $27.50, establishing the market at $27 to $27.50. The Butler, Pa. consumer which last week entered the market, placed an order for from 5000 to 10,000 tons of heavy melting steel scrap at $27.50. While practically every steel mill in the east is in the market, local users are not anxious to pay the present levels, some of which are from $1 to $3 per ton higher than a week ago. This disinclination to buy applies particularly to steel works which make their own pig iron but sell none of it. One large buyer of scrap here which ordinarily takes about 35,000 tons monthly, is not buying, and still the market is advancing. This is indicative of the shortness of supplies.

Prices Are Advanced

Cleveland, March 20.—Steady consumer demand is responsible for further advances in iron and steel scrap prices. Almost the entire list is affected, the average markup being 50 cents a ton. This brings heavy melting steel to $25 to $25.50, machine shop turnings to $19 to $19.25 and shovel turnings to $19.25 to $19.75. Heavy melting steel in the Mahoning valley has gone to $26.50 to $27 and cast iron borings to $21 to 21.50. No. 1 cast also has been advanced to $28 to $28.50. Deliveries are steady. Consumers are taking practically everything offered on contract.

Some Grades Are Higher

Cincinnati, March 20.—With little actual buying the local iron and steel scrap market continues firm, with prices higher on several items by 50 cents to a $1 a ton.

Strength of the market is due to the scarcity of stock. Some improvement has been noted in demand for foundry scrap, but this has not yet become a factor. Blast furnace grades are most active. Most of the buying is being done in small lots and to cover immediate requirements. New business is limited to speculative buying. Several sales of heavy melting steel are reported, in small tonnages. The outward movement of scrap from yards about equalizes that of tonnage coming in. Several local foundries have bought scrap outside of this market during the past ten days, contending they can obtain better prices elsewhere.

Melting Steel Advanced

Detroit, March 20.—Heavy melting steel has been advanced $1 a ton by dealers here. The advance is the result of one large consumer entering the market for a liberal supply. The remainder of the list is practically unchanged with consumers still indifferent to offers. Heavy melting steel is reported unusually scarce. Malleable likewise is sought and the market is regarded as firm.

Scarcity Is Growing

St. Louis, March 19.—An urgent demand, higher prices and continued scarcity are the outstanding features in the market for scrap iron and steel. The industries almost to a unit are seeking supplies, and are experiencing much difficulty in obtaining them. The yards are depleted of scrap and sold ahead, and unusually little scrap is arriving from the country. Country dealers are bare of prepared scrap, and far behind on shipments.

Other points are laboring under similar conditions to those obtaining here. Valley centers and Pittsburgh have been taking tonnages direct from here and absorbing much scrap which ordinarily would have found its way to this market. Peoria has come into the market and since Feb. 1 has purchased from 10,000 to 15,000 tons of steel. The steel plants in the district are making strenuous efforts to cover on their requirements, and small tonnages of heavy melting have changed hands as high as $24 per ton, the highest price on the movement and the peak for more than two years.

All cast grades continue scarce and in active demand. Local industries using this material held off buying too long, and most of the available tonnages have moved to Chicago and Indiana points. Stove foundries, which are doing a record business, are bidding against each other. Rolling mill grades are moving better locally, and heavy amounts have moved out of the district. One leading rolling mill interest purchased 2400 tons and is in the market for an additional 1000.

More Furnaces In

The Replogle Steel Co. has decided to put its second furnace at Wharton, N. J., in blast April 1. The company also is preparing its Oxford, N. J. stack for operation but has not yet decided when it will be lighted. The Delaware River Steel Co. blew in its blast furnace at Chester, Pa., March 12 on foundry iron.

The Adrian Furnace Co. contemplates putting its blast furnace at Du Bois, Pa., into operation at an early date. The Carbon Furnace Co. lighted its furnace at Parryville, Pa., March 17 on foundry iron. The Low Moor Iron Co. is preparing its Covington, Va., furnace for operation. It is not known whether this will mean

an increase in the company's pig iron output, however, since it may be necessary to bank or blow out the active Low Moor furnace for repairs.

Export Inquiries

Continues Active—Additional Shipments of Coke Sent to France

New York, March 20.—Export demand for finished steel products continues active. The feature is a heavy increase in the inquiry from England and from the Continent. England would buy large tonnages of skelp tubing and other materials if they were obtainable. Swedish buyers have numerous inquiries out, particularly for tin plate. Japan also has numerous inquiries out, particularly for rods, tin plate, structural shapes and plates. China continues to be in the market for so-called "boneyard" plates. In addition, there is a large inquiry from Cuba and the South American countries. While a large amount of foreign business is being entered, most of the large mills are rationing tonnage to their export buyers.

Considerable interest is being displayed by exporters in the pig iron market with a view to shipping American iron abroad. So far, however, prices are too high here to allow any specific selling of American iron abroad.

An additional 5000 tons of coke has been sold during the past week for shipment to France for blast furnace use. Ocean freight rates as well as prices here have advanced. Furthermore, a belief exists abroad that the Ruhr situation will be settled shortly, in which event no further American coke will be required.

Several 500-Ton Orders Placed from Stock

WAREHOUSE PRICES, PAGE 902

Cleveland, March 20.—Demand for iron and steel products out of warehouse is undiminished, and in fact, appears to be increasing. One interest here reports it has filled several orders within the past few days involving as high as 500 tons singly. While such lots have been exceptional 100-ton orders have been fairly numerous. Prices are strong and in view of rising costs and stronger mill prices another advance in warehouse prices is not unlikely in the near future.

Sheet Prices Advance

Detroit, March 20.—Warehouse sheet prices were advanced 25 cents per 100 pounds early this week due to strength at the mills and an urgent demand. Warehouse interests say the greatest strength is being shown in galvanized sheets which have advanced to 5.90c, Detroit, due to the spelter market.

Several Lines Advanced

New York, March 20.—The leading independent jobbers during the past week have advanced prices in several lines. Machine bolts and lag screws are now quoted at 45 per cent off; nuts $2 off; washers, $4 off; tank rivets 45 per cent off; and and structural rivets at $4.25 base. Advances in other lines are likely in the near future, owing to the advancing mill market. Demand is heavy.

Press for Sheet Delivery

Consumers Specifying Heavily on Contracts, in Urgent Need of Material—Mills Still Congested—Prices Are Strong

SHEET PRICES, PAGE 846

Pittsburgh, March 20.—Demands made upon sheetmakers in this and nearby districts are so extensive and so much pressure is being brought to bear for increased deliveries that producers are finding it difficult to satisfy all customers. Automotive buyers continue to specify heavily against their contracts. Most contracts on books have been turned into actual orders with specifications. Railroad car and locomotive builders, manufacturers of range boilers, small tanks, etc., and in fact practically all sheet fabricators are active and apparently in need of material. Difficulty in making shipments was increased considerably during the recent stormy weather so that little headway has been made in reducing piles of finished material on hand at various sheet mills. Embargoes still are in force in certain directions although the New York Central embargo on shipments to New England has been temporarily lifted. The American Sheet & Tin Plate Co. is particularly congested at Scottdale, Leechburg and Vandergrift, Pa., where perhaps 200 carloads are in hand awaiting shipment. The American company continues to operate approximately 80 per cent of sheet mills, being short of skilled and unskilled labor. Between 80 and 90 per cent is being maintained as an average operating rate by independents. The leading interest's prices for the third quarter have not been announced as yet and in the meantime its levels of 2.65c, 3.50c, 4.60c and 5.00c, base Pittsburgh, on blue annealed, black, galvanized, and full finished automobile sheets, respectively, are scarcely representative of the market since independents are quoting as high as 3.25c, 3.85c, 5.25c and 5.50c, base Pittsburgh, respectively. In connection with galvanized, the 5.25c figure is more or less isolated as yet but 5.15c has been quoted in more than one case. Shipments abroad have been heavier, mostly to Japan, on orders taken recently for thin-gage black sheets.

Sell for April Delivery

Youngstown, O., March 20.—While sheetmakers generally have not opened their books for second quarter business, some sales have been closed for April delivery. A price of 3.70c, Pittsburgh, was paid for 300 tons of black and 4.90c, Pittsburgh, for approximately 200 tons of galvanized. This business represented an open rolling for next month and was quietly offered to a few customers. Only two mills in this district are submitting quotations. Quotations apply on April shipments only and are 3.75c for black and 3.00c on blue annealed. One producer of galvanized here endeavored to place several hundred tons of galvanized specifications at prices ranging from 4.60c to 4.75c but was not successful in obtaining a price of any character. If tonnages of the three grades of sheets were available in this district, according to one producer, black would command 3.75c, blue annealed 3.00c and galvanized 5.00c, Pittsburgh.

Difficult To Buy Sheets

Chicago, March 20.—Chicago producers of sheets are fully sold up to the middle of the year, and some have heavy tonnages for the third quarter. Efforts of Chicago users to obtain further supplies in the East are unsuccessful as producers there have little tonnage left for second quarter delivery. Automobile builders apparently are short of material and are seeking it at prices considerably above the market. It is apparent that the best prices now available are 3.00c, Pittsburgh, for blue annealed; 4.00c for black, and 5.00c for galvanized. Considerable demand for sheets for export is coming into the market and as high as 5.25c, Pittsburgh, has been bid for galvanized.

Eastern Market Stronger

Philadelphia, March 20.—Sheetmakers' full output is required to meet requirements of regular customers and therefore they are declining to quote on much tonnage from other than such sources. Prices are higher, mills pointing to higher costs as the reason. Blue annealed sheets are quoted 2.85c to 3.00c, base Pittsburgh, but it is difficult do 2.85c, while small lots are sold at 3.15c. It is difficult to buy black sheets for any nearby delivery under 3.85c, Pittsburgh, or galvanized at less than 5.00c. Some makers of galvanized are asking prices as high as 5.50c. Automobile sheets are 5.00c to 5.35c, Pittsburgh.

Ford Motor Asking Prices on Iron Ore

Cleveland, March 20.—Inquiries are now in hand for large tonnages of Lake Superior iron ore and some of the leading producers say that prices will be quoted in a few days, though other representative interests are endeavoring to hold back until it is determined definitely whether there will be an advance in wages in the next few weeks. Reports that a large company is contemplating an advance and that this will be extended to mine labor are heard among the independent operators, though there is nothing definite to substantiate the report. Some new long-term contracts have been entered into to take the price prevailing at time of delivery, one of these for a consumer in the Pittsburgh district. Among the inquiries in the open market at present is one from the Ford Motor Co., for around 300,000 tons of ore.

The committee on securities of the New York curb market has admitted to trading the capital stock of the Eastern Steel Castings Co., which recently purchased the Newark plant of the American Brake Shoe & Foundry Co.

Bar Bookings Restricted

Deliveries Are Deferred as Producers Seek To Care for Regular Customers —Much Additional Tonnage Being Declined—Prices Stronger

BAR PRICES, PAGE 846

Chicago, March 20.—Users of soft steel bars are not letting up in their requests for further contracts, but are specifying for delivery. The shortage of steel resulting from the heavy demand and somewhat limited production of mills is causing great inconvenience to consumers.

The past week is the third consecutive week in which sales of plates, shapes and bars have run far beyond the average for the present year. Demand is coming from all classes, with automobile builders, agricultural implement makers and reinforcing bar sellers giving the largest lots. Car builders are also requiring considerable tonnages of soft steel bars. Bars are strong at 2.30c to 2.35c, Chicago mill, the higher price being the only one available.

The bar iron market is steady at 2.50c, Chicago mill, although it is understood as high as 2.60c has been paid for some tonnage. Rail steel bars are firm at 2.30c, mill, with a strong and steady demand which is building up a backlog for practically all mills.

Write Contracts at 2.25c

Pittsburgh, March 20.—Contracts for merchant steel bars for delivery in the second quarter largely have been and are being written by some mills at 2.25c, base Pittsburgh, with regular customers. Open market quotations, however, run from 2.35c to 2.50c with but little material available.

Orders are scanned carefully and pared down wherever possible. Some contracts involve several thousand tons while others are smaller. A large number noted the past week are from the cold-drawn steel bar industry and are based upon continued sizable buying by the automotive industry. One large merchant steel bar producer states the present situation is worse than in more than 20 years.

The refined iron bar situation shows considerable improvement, orders being taken for as much as several carloads at a time. Ordinarily refined iron still is quotable at 3.00c while double refined iron remains at 4.75c, base Pittsburgh.

Deliveries Are Deferred

Buffalo, March, 20.—The market for soft steel bars is from 2.25c to 2.50c Pittsburgh with little or no tonnage available at the lower figure. Delivery is promised for June, July and later. The leading interest is delaying deliveries 6 to 9 months. One inquiry out for estimating purposes by a car builder calls for about 800 tons.

Bookings Being Restricted

New York, March 20.—A brisk demand features the steel bar market and due to the extent to which the mills are sold up they are restricting bookings. Most of them now are simply trying to take care of their regular trade. The minimum price on steel bars is 2.25c Pittsburgh and considerable tonnage is being rationed to regular customers at this price. Considerable business also is going at 2.35c base Pittsburgh and some at 2.50c.

Iron bars may be quoted at 2.40c base Pittsburgh, which figure now is minimum. A feature of the recent buying has been the placing by the American Locomotive Co. of approximately 800 tons of cold-finished steel.

More Sales at 2.25c

Cleveland, March 20.—New business is not so brisk in steel bars but consumers are crowding the mills as much as before for deliveries against orders on the books. Nuts, bolt and rivet manufacturers especially are pressing for tonnage, indicating that their business is very active. The price of 2.25c, Pittsburgh, is well representative for delivery in the second quarter or in the case of larger producers heavily booked with business, for shipment some months hence. One independent producer which has refrained from taking on second quarter business, during the past week opened its books to regular customers at 2.25c, Pittsburgh. A recent sale of 200 tons by another independent for four to five weeks shipment was made on the same basis. Hoops and bands now are on a firm minimum of 3.05c, Pittsburgh, with lighter gages and narrow widths selling at 50 cents or more per 100 pounds. A heavy demand is current for bands and strips over 4 inches wide.

Order Books in Good Shape

Pittsburgh, March 20.—With order books in fine shape because contracts have largely been turned into specifications, cold-drawn steel makers here are indifferent to further bookings. They are turning down much business and are devoting attention to the liquidation of present commitments.

Nothing is being said about prices because they are practically out of the market, and while the quotation remains nominally 2.80c, base Pittsburgh, on the present merchant steel bar market at a minimum of 2.25c, it probably would be 3.00c to 3.10c on any new business developing. Such figures in fact are being quoted on single carloads that cannot be flatly turned down.

Specifications for Nuts, Bolts, Rivets Heavy

NUT AND BOLT PRICES, PAGE 906

Pittsburgh, March 20.—Groups of orders for nuts, bolts and rivets involving an aggregate of from 20 to 40 carloads are being received several times each week. The present demand is brisk. This inflow of business is evenly divided between nuts, bolts and rivets. It is coming from all directions from different consuming lines, mainly railroad buyers, car builders, etc. The prices on rivets daily gain strength until now it is doubted by leading producers here if any sales are being recorded at below the market levels, 3.25c and 3.35c, respectively, on structural and boiler rivets. One maker continues to quote 3.50c and 3.60c, respectively. Operations are about 80 per cent of capacity.

Buy Second Quarter Bolts

Chicago, March 20.—Contracting for bolts and nuts for second quarter is proceeding and all users who usually contract are becoming interested. The situation in nuts and bolts is generally strong and makers have heavy obligations. A railroad in the Northwest has recently come into the market for a heavy tonnage of car bolts.

Prices Are Firm

Cleveland, March 20.—Specifications against contracts for bolts and nuts are heavy, and producers are making every effort possible to fill consumers' requirements. Operations are being increased, wherever possible, although a labor shortage as well as the inability to obtain steel supplies are hindering this action to some extent. Prices are firm and makers are having no difficulty in obtaining contracts on the basis of published discounts, no shading being reported.

Rivet demand continues heavy and the quoted prices of 2.25c and 2.35c, base Pittsburgh, on structural and boiler rivets, respectively, are being firmly maintained.

Hoops and Bands Higher

HOOP PRICES, PAGE 846

Pittsburgh, March 20.—Hoop and band makers have considerable business for some time to come and because deliveries are deferred to a time when higher production costs undoubtedly will prevail, quotations of at least $5 a ton above the nominal market are being named. For instance, while the nominal market of 3.05c continues in force, tonnage orders in the base sizes are taken as high as 3.30c, base Pittsburgh. In the narrow sizes around 1-inch of the thin gages, up to 3.60c is noted; and in the exceedingly narrow sizes 5/8-inch, ½-inch, etc., higher than 4.00c recently has been quoted. Inquiries continue to develop from time to time, one calling for several hundred tons involving several different sizes, 50 to 100 tons of a size.

Steel Castings Sales Are Lower in February

Sales of commercial steel castings declined about 9 per cent in February, according to the bureau of census, Washington, in co-operation with the Steel Founders' society. Reports were received from companies comprising over two-thirds of the commercial castings capacity of the United States. Total bookings reported in February were 90,152 tons and were made by companies having a normal capacity of 96,900 tons, or at the rate of 93 per cent of capacity, as against revised January bookings of 103,581 tons at 106.9 per cent of capacity. Bookings of railway specialties amounted to 39,845 tons or 104 per cent of capacity as against 125 per cent of January bookings. Bookings of miscellaneous castings totaled 50,307 tons, or 85.8 per cent of capacity, as compared with 95.1 per cent for the January bookings.

The following table shows the book-

ings of commercial steel castings for the past eight months by 65 companies with a monthly capacity of 96,990 tons, of which 38,300 tons are usually devoted to railway specialties and 58,600 tons to miscellaneous castings:

	Total Net tons	Per cent capacity	Railway Specialties net tons	Miscellaneous net tons
1922				
July	66,166	68.3	32,372	33,794
Aug.	63,416	65.4	21,843	41,573
Sept. ...	97,919	101.1	56,781	41,138
Oct.	75,709	78.1	34,276	41,433
Nov. ...	60,899	62.8	22,131	38,768
Dec.	68,889	71.1	28,271	40,618
1923				
Jan.	*103,581	106.9	47,879	*55,702
Feb.	90,152	93.0	39,845	50,307

*Revised.

Sheet Sales Hold but Production Drops

Approximately the same quantity of sheets was sold in February as during January as revealed by data compiled by the National Association of Sheet and Tin Plate Manufacturers. The following is the comparative table for January and February:

	Net tons February	Net tons January
Total sales for month.....	253,197	252,489
Total production	237,919	260,520
Total shipments.....	217,808	248,337
Finished stock on hand awaiting shipment.....	119,237	99,321
In stock, unsold.....	29,123	32,229
Unfilled tonnage as of March 1 and Feb. 1.....	547,897	511,897

The total number of hot mills in the United States at present is 668 with a monthly capacity of approximately 381,000 net tons. The capacity represented by the following figures is 70.1 per cent of the total for the country.

Tap and Die Companies Will Be Merged

Boston, March 20.—Plans are under way for the merger of several leading tap and die manufacturing interests. It is understood the merged firms will operate under the name of the Frank O. Wells Co., Inc. The consolidation will include the American Tap & Die Co., Greenfield, Mass., and the Williamsburg Mfg. Co., Williamsburg, Mass. It is understood the new firm will be headed by Frank O. Wells, president of the Greenfield Tap & Die Corp., which he organized in 1912. Mr. Wells is well known not only for his industrial and business activities but also through his activities in public life, having served in Congress for several terms.

Expect Spar To Advance

Pittsburgh, March 20.—Three or four sales involving from 100 to 500 tons each of fluorspar were closed late last week by selling interests here. These mostly were for delivery in the second quarter and were attributed partly to the expectation on the part of consumers of higher prices. Quoted levels for the time being are unchanged on the basis of $20 for the unguaranteed material although buyers claim to be able to buy at $19, and $21.50 for the guaranteed spar, f.o.b. Kentucky and Illinois mines. Several sales of ground fluorspar too, were consummated.

Large Tank Jobs Placed

Week's Awards Include Two Calling for More Than 20,000 Tons of Plates—46,000 Tons of Steel Needed for Chicago Car Orders

PLATE PRICES, PAGE 846

New York, March 20.—Plate demands generally are not as large as in recent weeks, although individual tonnages of size continue to come out here and there, notably in connection with car and locomotive building. Included in the current business are several inquiries from foreign sources, particularly Japan and China. Included in Chinese inquiries are tonnages of so-called "boneyard" plates. Light gages are being called for at present out of all proportion to the heavy gages. As a result, some of the mills are asking higher prices on lighter gages. In some cases a net price of 3.00c, base Pittsburgh, has been quoted on 3/16-inch plates in narrow widths and 2.75c, Pittsburgh, has been quoted on ¼-inch plates. The bottom of the market is reflected by the minimum quotation of the Steel corporation and leading independents of 2.35c, Pittsburgh. A large amount of the current tonnage, however, is going at 2.50c, base Pittsburgh, and some business has been done at 2.65c. The American Bridge Co. just has booked an order for tanks involving 12,000 tons of steel. The tanks are to be erected at Pearl Harbor, Hawaii, for the Pan-American Petroleum & Transport Co. Included are about 100 tanks ranging from 150,000 barrels to 25,000 gallons capacity each.

T. A. Gillespie Co. is low bidder on 10,000 tons of riveted steel pipe for the Catskill aqueduct work, Brooklyn. Merritt-Chapman Derrick & Wrecking Co. is low bidder on the general contract for 4500 tons of submarine cast iron pipe for under the Narrows. Awards are expected within two weeks. Riter-Conley Co. has closed on 600 tons of tank work for a private oil interest in Los Angeles.

Tank Demand Keeps Up

Chicago, March 20.—Interest in the steel plate market centers about purchases of plates for oil storage tanks, although railroad car requirements also call for much plate tonnage. A Chicago fabricator of tanks has bought 2000 tons and is in the market for 5000 tons additional. The Petroleum Iron Works is seeking 3000 tons for fabrication at its shops at Argentine, Kans. The Standard Oil Co. of Indiana is inquiring for 600 tons. Plates for car building promise to add a large total, as cars contracted with builders in the past week will take 46,000 tons of steel, of which a large part is plates. New inquiry for cars just coming out calls for 95,000 tons of steel. Plate prices are strong at 2.45c to 2.50c, Chicago mill.

The Chicago Bridge & Iron Works has booked 24 80,000-barrel tanks for the Marland Refining Co., to be erected at Ponca City, Okla. The tanks will require 7200 tons of steel.

Car Company Inquiring

Buffalo, March 20.—The plate market is firm but not much quoting is being done. The largest inquiry out now is from a car company which is estimating a job which will require 11,000 tons.

Expansion in Buying Continues

Pittsburgh, March 20.—Expansion in buying rates continues to be noted by plate sellers, particularly in connection with plates of tank quality.

While around 2.25c represents the price named in many contracts now upon the books, open market quotations present a spread of 2.35c to 2.65c and even higher than that maximum lately has been received as premium prices for prompt deliveries. The formal contract has been received by the Riter-Conley Co. for twenty 80,000-barrel tanks for the Midway Petroleum Corp., San Pedro, Cal., as reported in last week's IRON TRADE REVIEW. This order involves 6000 tons of plates. Among numerous small tank propositions is one for twenty 15,000-gallon tanks for a Massillon, O., interest.

Demand Is Sustained

Philadelphia, March 20.—Plate makers report a sustained eastern and a growing western demand. Lots as large as 1200 and 1500 tons are being inquired for in the East by western consumers. The prevailing price idea on western business is 2.75c base eastern mill, although not all mills are quoting on this business. Eastern makers continue able to give good deliveries ranging from four to eight weeks. Both the Pennsylvania and the Reading railroads placed substantial plate tonnages during the past week at 2.50c, base Pittsburgh. Several other buyers placed lots of 500 to 1000 tons. Several such lots are pending as well as a good small demand. Prices are advancing, the minimum being 2.35c, base Pittsburgh. Most current business brings 2.50c but some business including second quarter contracts were booked at 2.65c and one maker booked some second quarter business at 2.75c. Bids will be opened tomorrow on a combination freight and passenger vessel for the New York & Porto Rico Steamship Co. requiring 4000 tons.

Early Tonnage Is Scarce

Cleveland, March 20.—Plates for early shipment are exceedingly scarce and prices in consequence are stronger than ever. Sales for four to six weeks delivery continue to be made by eastern mills on the basis of 2.90c to 3.00c, Pittsburgh. Some steelmakers in the Pittsburgh district have placed business at 2.75c mill. One southern buyer was able to do 2.40c, Chicago, recently for four to six weeks delivery and another buyer placed some tonnage in the Chicago district at $6 under the equivalent eastern mill price. A local maker has advanced its schedule $2 to 2.60c, base, Pittsburgh, for boiler steel and 2.75c for tank. The leading producer now is quoting 2.35c, Pittsburgh, an advance of $2 a ton. This figure represents the minimum of the current market. One lot of 500 tons of plates for a boiler shop has been pending in this district as well as 200 tons for a power company in Pennsylvania. The Standard Oil Co. is understood to have closed on a recent inquiry for 800 tons of boiler steel.

Book More Semifinished

Some Mills Accommodate Regular Customers at $42.50—$45 Paid in Open Market—Second Quarter Rods at $50

SEMIFINISHED STEEL PRICES, PAGE 846

Pittsburgh, March 20.—While the actual going market on sheet bars, billets and slabs undoubtedly is $45, certain steelmakers in the Pittsburgh and Youngstown territories are taking on regular long standing customers at $42.50 for the second quarter. It is doubted if the Carnegie Steel Co.'s price to such buyers as the American Sheet & Tin Plate Co. will be even that high. However, a nearby sheetmaker which bought at $45, Cleveland, closed on 3000 tons monthly for the quarter on that basis and also closed on 2000 tons with a Pennsylvania steelmaker at about $45, Pittsburgh. Another buyer in this district closed a tonnage this past week on a $45 Youngstown basis, which is indicative of the shortness of available material in the semifinished market.

Plenty of opportunity exists for the sale of billets of forging quality and buyers are willing to pay $50, Pittsburgh, or higher.

Numerous requests for wire rods continue to be received by makers. These come from various directions. Most of them have to be refused. The price of $50 means little and the American Steel & Wire Co.'s levels of $47 and $49.50 also are nominal. Some independent mills have fixed their second quarter price on rods at $50 base, Pittsburgh which means for ¼-inch.

Skelp consumers are active in issuing inquiries but likewise encounter difficulty in placing ther requirements so that some large tonnage business is going begging. From 2.50c to 3.00c, base Pittsburgh, is quoted although material is being delivered on contracts taken earlier in the season at 2.25c and lower.

Wire Rod Output Rationed

New York, March 30.—Heavy demand continues to feature the wire rod market. The mills have no tonnage to spare and are able to do little better than ration their regular trade. Prices on regular requirements range from $47 to $50, base Pittsburgh. In some cases there is a variation in price, according to the gage. In certain instances the mills are quoting $50, base Pittsburgh, on rods lighter than ¼-inch and $52.50, base, on rods ¼-inch and heavier.

Billet Prices Higher

Philadelphia, March 20.—Billet prices are higher. Several thousand tons were sold by eastern makers in the past week at $43.50 to $45, base Pittsburgh, for rerolling quality and $52 to $53, base Pittsburgh for forging grades. It is now difficult to shade the top prices.

Little Material Available

Youngstown, O., March 20.—Unless mill connections have been established, no semifinished material will be available from producers in this district for second quarter, as far as can be foreseen at present. Customers of long standing practically are assured of their supply of sheet bars for April delivery at around $42.50, Youngstown. Should any surplus sheet bars arise as the quarter proceeds, a price of $45, Youngstown, likely will apply on sales. One source of supply in this district has not opened its books for second quarter business but as soon as present obligations, which are closely confined, are executed forward sheet bar business will be considered at a price between $42 and $45, Youngstown.

Try To Cover for Third Quarter

Cleveland, March 20.—A feature of the market for semifinished material here is the strong interest shown by buyers in tonnages of sheet bars, billets and slabs for delivery in the third quarter. They are anxious to obtain favorable position on mill books, and a large share of capacity for that quarter could be covered were makers inclined to commit themselves. The leading northern Ohio mill has not opened its books for third quarter and is sold up entirely for the second quarter. An inquiry for 8000 to 10,000 tons of sheet bars from a northern Ohio interest for the second quarter is pending here, and there still is a large unsatisfied demand for billets and slabs. Other steelmakers in the Youngstown district and in northern Ohio recently have been in the market. A price of $45 has been offered in some cases for sheet bars, without takers.

Some producers of wire rods have fixed their second quarter price at $50 Pittsburgh for ¼-inch and finer and at $52.50 for coarser than ¼-inch. Consideable tonnage has been booked at these prices.

Pipe Consumers

Still Seeking Tonnages—PipeLines Postponed—Cast Demand Heavy

PIPE PRICES, PAGE 846 AND 906

Pittsburgh, March 20.—Efforts of pipe jobbers and buyers generally to increase tonnages on books of producers show no letup. Some inquiries originally involving 1000 to 2000 tons or more each have been cut down 50 to 75 per cent. Various pipe jobbers are able to place nothing at all with certain mills because they still have several hundred tons coming to them. In the face of these circumstances it was impossible for the Texas Co. to place its 45,000 to 50,000-ton order for 6 to 16-inch pipe, about 400 miles, asked for recently. This project has been indefinitely postponed as have several other line pipe installations. One or two have been abandoned entirely. Instead of diminishing from week to week, demand for oil country goods seems to increase. Jobbers in the West and South are more active in seeking tonnages than are jobbers in the districts nearer producing points.

Demand Is Tremendous

New York, March 20.—Tremendous demand features the pipe market. This is coming from the building trade, from foreign sources and from various oil companies. That from the oil interests is most spectacular. Considerable oil tonnage has been placed but the bulk of the inquiry has been withdrawn owing to inability of the prospective buyers to obtain material. The largest inquiry recently has been from the Texas Co. which took prices on 30,000 to 35,000 tons for a pipe line. The Sinclair interests, Standard Oil and Mexican Petroleum Co. all have been in the market for lots ranging from 9000 tons downward.

The bureau of water, gas and electricity of this city has closed on 10,000 tons of cast iron pipe, the business being divided between the Warren Foundry & Pipe Co., the United States Cast Iron Pipe & Foundry Co. and the Donaldson Iron Works. Today, the bureau of water supply closes bids on about 5000 tons of submarine pipe for installation under the Narrows, and on March 27, the city closes on general contractors' bids for supplying and installing about 1500 tons in the Bronx and Richmond boroughs. The market generally continues active, with shops in this district sold up into July. Shortage of cars is handicapping shipments considerably.

Shops Are Well Sold

Chicago, March 20.—Makers of cast iron pipe have so much business on their books they are slow to bid on projects coming up or else bid on basis of delivery at their convenience. It has been long since pipemakers have had so much tonnage on their books, and almost without exception they are choosing their business. Bids will be opened March 23 at Youngstown, O., on 1275 tons. The city of Chicago has placed about 1200 tons with the United States Cast Iron Pipe & Foundry Co., which also has booked a fairly large aggregate tonnage from Detroit suburbs. The market is quoted at $48, Birmingham, for the base size by most producers.

Shops Are Overcrowded

Birmingham, Ala., March 19.—Lettings for small sizes of pressure pipe are still numerous. Plants are overcrowded with business for 4 to 10 and even 12-inch sizes. Quotations have been advanced $1 and more per ton, the result of increased costs of production. Indications are that the United States Cast Iron Pipe & Foundry Co. will supply a portion of an order for 5300 tons recently placed by Chicago. The American Cast Iron Pipe Co. received many orders of smaller tonnages some time ago. The announcement of the advance in prices has not effected inquiries. Enough business is provided by that contracted and in sight to warrant steady operation through practically the balance of the year. Export business, including the California trade via port of Mobile and by water through the Panama canal, is increasing.

Manganese Alloys

Remain Scarce and Higher Prices Paid —Spiegel Market Advanced

FERROALLOY PRICES, PAGE 846

New York, March 20.—The price on domestic spiegeleisen has been advanced to $40 furnace for 19 to 21 per cent and $39 for 16 to 19 per cent. Lots of several thousand tons probably might be placed at slightly less. The market is strong and the output over the first half has been sold. Inquiries totaling several thousand

tons now are before sellers. The second furnace at Palmerton, Pa. is to be put in blast about April 1, but the production of this furnace also has been sold through the second quarter.

Premiums are being paid on a larger scale for ferromanganese for early delivery. Some moderate tonnages for second quarter have been sold during the past week at $125 duty paid tidewater. The minimum price on second quarter tonnage now is $120 duty paid tidewater. On third quarter ferromanganese both the importers and the domestic merchant producer are quoting $115 duty paid tidewater. Sales of well over 1000 tons have been made at this figure for the third quarter. Most of the third quarter output has been sold and some importers are out of the market entirely for third quarter, while others are unable to book any tonnage for shipment earlier than September.

The minimum price of 50 per cent ferrosilicon has been advanced $2.50 to $92.50, delivered. Sales have been made at the new price. Tungsten ore prices have been stiffening. No further supplies of good grade wolframite appear available under $8 a short ton unit and some important factors now are quoting $8.25 to $8.50. Ferrotungsten prices are unchanged at 88 cents a pound contained; tungsten powder, 94 cents to $1. The quotation for 4 to 6 per cent carbon ferrochrome is unchanged at 12 cents.

Sales of the tool steel grade of ferrovanadium have been made at $3.75 a pound contained and this now is the minimum price. Good business has been done in the open-hearth grade at $3.50 a pound contained minimum up. Business thus far in March is at the highest rate in several years.

Ferromanganese Sells at $125

Pittsburgh, March 20.—Increasing prices and intermittent sales characterize the ferroalloys market. On English ferromanganese for prompt shipment as high as $125 seaboard base, duty paid, is quoted and has been paid. For the third quarter and last half, the price is $115, or $119.79, delivered Pittsburgh. Several round tonnages of domestic metal have been closed for third quarter and last half at $120 seaboard or $124.79 delivered Pittsburgh, as well as smaller lots. The Forged Steel Wheel Co. purchased 200 tons of English ferromanganese for third quarter before the advance. The Kokomo Steel & Wire Co., Kokomo, Ind., is understood to be in the market for 500 tons. One large western interest is understood to have closed on 3000 tons.

While spiegeleisen still is quoted at $36 and $37 for 16 to 19 per cent and 19 to 21 per cent, respectively, for prompt delivery, none is available for prompt shipment so that those prices mean nothing. For delivery subsequent to July 1, $40 for 19 to 21 per cent, and $39 for 16 to 19 per cent is being quoted on lots up to 100 tons, and $39 and $39 respectively.

The Crucible Steel Co. of America recently negotiated for 4500 pounds of ferrovanadium. While $3.75 has been obtained on smaller quantities $3.50 possibly would still be quoted on shipments of this size. Fifty per cent ferrosilicon remains scarce. One sale of 40 tons, packed in barrels, was closed last week at $91, freight allowed. Another order for 15 tons was taken at $105, delivered.

The Nonferrous Metals

Renewed Rise in Copper Makes It Center of Interest—Products Active and Up—Zinc Strong—Tin Wild

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
March 14...	17.00	17.12½	49.75	8.37½	7.90	25.25	8.75	29.00
March 15...	17.00	17.12½	50.87½	8.37½	7.95	25.25	8.62½	29.00
March 16...	17.12½	17.25	51.25	8.37½	8.00	25.25	8.62½	29.00
March 19...	17.25	17.37½	50.25	8.32½	8.00	25.25	8.62½	29.00
March 20...	17.30	17.50	49.50	8.32½	8.00	25.25	8.62½	29.00

†Outside market quotation.

NEW YORK, March 20.—The nonferrous metal markets have been strong and generally active in the past week.

Copper resumed its leadership in point of interest, recovering from the slight reaction of the first week in March and moving to new high levels. Zinc similarly moved to new high prices after its slight recession. Tin has been fluctuating widely from day to day, with swings as much as £10 in London and 2 cents in New York. Lead has sagged under the influence of offerings by the principal factors in the market and caused lead buyers to move cautiously. Antimony reacted somewhat in the future positions. Aluminum has been scarce and consistently strong.

Consumption of metals and metal products is unabated and good sized orders placed by automotive companies for second half indicate continuance of good metal business beyond the second quarter. Brass and copper mill products and sheet zinc are up ¼ to ½ cent.

Electrolytic copper sold freely March 19 at 17.25c, delivered, for second quarter delivery, and some producers now are quoting higher prices. The rise here has been assisted by the strong London market, which advanced £4 within a week, with corresponding increase in export quotations and good export business. Casting copper has sold 16.87½c, refinery. China has been inquiring for 2,000,000 pounds of casting or furnace refined copper. Lake copper advanced to 17.50c, delivered. Large business is reported in rolled and drawn copper and brass products.

Zinc advanced to the long expected 8c, East St. Louis, level. March shipment sold at this price; second quarter at 7.87½c; third quarter at 7.75c. Brass special has been scarce and in good demand at 8.25c, East St. Louis. High grade zinc is also scarce and firm at 9c, delivered.

Lead prices reacted to 8.25c, East St. Louis, for prompt and March shipment; and 8.30c, New York. Desire of large interests to restore a normal relationship between New York and St. Louis, caused offerings at the lower St. Louis price, thereby bringing about a decline in the market. The Smelting company's price is unchanged at 8.25c, New York.

Tin prices have ranged from 51c to 49.50c the past week, with activity in this market largely professional. London has been fluctuating violently under the speculative control in London, and consumers in this country, being for the most part well supplied, have been watching developments. Chinese 99 per cent tin has been quoted generally about 1¼ cents under Straits.

Antimony sold for immediate shipment from England at 6c, c.i.f., in bond, equal to 8c, duty paid. Spot here has been quoted nominally 8.62½c to 8.75c, duty paid. Business has been fair. No first hand offerings are being made for importation from the Orient.

Sales of 99 per cent virgin ingot aluminum have been made at 26.50c, New York. Little 98 or 99 per cent is being offered by any seller. The Aluminum Co. of America's quotations are unchanged at 25c for 98 to 99 per cent and 26c for 99 per cent, but it is understood to be behind on its deliveries.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled 24 oz., min.	25.25
High brass	21.50
Zinc, ga. 9 to 18 (plates ½c less)	10.00
Lead, full sheets (cut ¼c more)	11.50
Aluminum, base 18 ga. and up	35.40
SEAMLESS TUBES	
High brass	26.00
Copper	27.50
RODS	
High brass, round, ¾ to 2½ inch	19.75
Naval brass rod	22.00
WIRE	
Copper	19.37½
High brass	22.00

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	11.50 to 12.00
New York	11.25 to 11.75
Chicago	12.25
HEAVY YELLOW BRASS	
New York	8.25
Chicago	9.25
Cleveland	9.00 to 9.50
ZINC	
New York	4.25 to 4.75
Cleveland	4.50
HEAVY COPPER AND WIRE	
Cleveland	14.00 to 14.50
New York	13.25 to 13.75
Chicago	14.25
RED BRASS TURNINGS	
New York	10.25 to 10.75
Cleveland	10.50 to 11.00
Chicago	11.00
YELLOW BRASS TUBING	
Cleveland	9.00 to 9.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	8.50
New York	8.00 to 8.50
Chicago	8.75
ALUMINUM BORINGS	
Cleveland	12.00 to 14.00

Structural Demand Falls

Building Activity Stronger in Some Sections of the Country and Weaker in Others—February Bookings 177,000 Tons—Prices Are Increased

STRUCTURAL SHAPE PRICES, PAGE 846

Washington, March 20.—A further increase in sales of fabricated structural steel is reported for February, according to figures received by the bureau of census. February sales amounted to 80 per cent of shop capacity as against 76 per cent for January. Total sales reported for February by 151 companies with a shop capacity of 219,955 tons per month, amounted to 176,787 tons, the highest since last May. The following table compares reports of 164 identical companies with a shop capacity of 223,355 tons per month from April through October, while earlier figures are based on reports received by the Bridge Builders and Structural society. For comparative purposes, the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

Monthly structural awards as reported by the bureau of census are as follows:

	Actual bookings tons,	Per cent of capacity	Estimated total bookings, tons
February	176,787†	80	200,000
January, 1923..	168,336‡	76	190,000
December	130,082	58	145,000
November	108,593	49	122,500
October	128,315	58	145,000
September	143,566	64	160,000
August	152,253	68	170,000
July	153,903	69	172,500
June	162,876	73	182,500
May	181,503	81	202,500
April	197,796	89	222,500
March	139,300	77	192,500**
February	78,700	43.5	108,750**
January, 1922..	72,100	40	100,000**

† Reported by 151 companies with a capacity of 219,955 tons. ‡ Reported by 161 companies with a capacity of 222,605 tons.

** Figures of Bridge Builders and Structural society revised on basis of 250,000 tons capacity.

Pending Contracts Are Large

Detroit, March 20.—Pending contracts for structural steel in proposed new buildings in this city total about 23,000 tons, exclusive of demands that the Ford Motor Co. is expected to make for its new work at River Rouge. These requirements may reach 20,000 tons.

The proposed new building of the Buhl Land Co. will require about 8000 tons while the proposed new Murphy building to be erected at the corner of Fort and Griswold streets will require about 7500 ton. Work on this structure may be delayed a year or more. The proposed Statler hotel will require about 7800 tons.

On 2.35c to 2.40c Basis

Buffalo, March 20.—A local car builder estimating on a contract, has asked for figures on approximately 5000 tons. General quotations are on a 2.35c to 2.40c basis.

Demand Continues Heavy

New York, March 20.—Demand for structural steel is in as heavy a volume as at any time since the present movement set in. The shops and mills are being heavily overtaxed. The minimum of the shape market on tonnage for reasonable delivery continues around 2.50c, base Pittsburgh, but this figure is not as general as previously. Mills for the most part are confining all efforts to handling the requirements of their regular customers. Awards of size the past week have been relatively light, a fact due in no small measure to the difficulty in placing business at anything like the deliveries desired.

Structural Enginering Is Heavy

Chicago, March 20.—Considerable new inquiry for structural material is coming into the market and with fabricators heavily booked, it is difficult to see how these projects can be handled and delivery made. During the present week new projects involving more than 17,000 tons have come out in the Chicago market. An elevator project in Maryland for the Baltimore & Ohio railroad, requiring 2650 tons was brought out during the past week. Lettings in the West during the past week have been light. Plain material continues unchanged at 2.40c to 2.45c, Chicago mill, with only the higher figure at present available.

Pittsburgh Low in Tonnages

Pittsburgh, March 20.—As was the case in 1920, Pittsburgh apparently is lagging behind other districts in the total tonnages of structural shapes being awarded. Most of the work going through local fabricating shops is for projects in other territories and on the large number of orders placed within the past several weeks they are assured of 70 to 80 per cent operation schedules for months to come. While arpund 2.25c probably applies in connection with most of these for the raw material, open market quotations on structural shapes now run from 2.35c to 2.65c and buyers apparently are not so much concerned about price as they are about deliveries. One of the largest awards in this immediate vicinity is the 950-ton job for the building of the Pittsburgh Plate Glass Co. This went to the McClintic-Marshall Co. The American Bridge Co. was awarded transmission towers by the Appalachian Power Co., Bluefield, W. Va., approximately 1000 tons. The Russell Wheel & Foundry Co., Detroit, received the contract for a building for the Fisher Body Corp., Pontiac, Mich., 1400 tons.

Varied Prices Are Quoted

Philadelphia, March 20.—Shape demand continues heavy with mills choosing their business carefully. Most of the buying is from fabricating shops and warehouses. Good inquiries continue to come in from the West. While 2.35c, base Pittsburgh, is the minimum, this price is exceptional. One large eastern maker quoted 2.60c, base Pittsburgh. Some business is being taken by two other eastern mills quoting mill base, which is generally 2.75c. On the basis of delivered Philadelphia this is equivalent to 2.55c to 2.60c, base Pittsburgh. Small sales have been made at 3.00c, base mills.

Reports Falling Demand

Cleveland, March 20.—Two awards made during the past week involved 1500 tons of structural material which was the highest total closed in several weeks. The largest of the two projects, that of the Commodore apartment, Cleveland, calling for 1000 tons, was awarded to the J. E. Moss Iron Works. The other was that of the Bedell building, Cleveland, requiring 500 tons, this award going to McClintic-Marshall Co. No new projects for any considerable tonnage were brought out during the week. One contractor is seeking 800 tons for an unknown job. Fabricators report a falling off in inquiries. Some eastern mills are quoting up to 2.85c, eastern mill, on plain shapes. The leading interest now is quoting 2.35c, base Pittsburgh, against 2.25c previously and large independent mills are on that basis for practically indefinite delivery.

STRUCTURAL CONTRACTS PLACED

Building awards this week..... 17,036 tons
Building awards last week..... 24,507 tons
Building awards two weeks ago.... 38,211 tons

1600 tons, loft building for Bricken Construction Co., Thirty-seventh street and Seventh avenue, New York, erroneously announced last week as awarded to Hedden Iron Construction Co., awarded to A. E. Norton, Inc.

1500 tons, Kaufman loft building, Seventh avenue, near Thirty-seventh street, New York, to Hay Foundry & Iron Works.

1400 tons, building for the Fisher Body Corp., Fontiac, Mich., to the Russell Wheel & Foundry Co.

1400 tons, coal breaker and trestle for Wentz Co., to the Bethlehem Fabricators, Inc.

1250 tons, sawmill for American-Oregon Lumber Co., Veronia, Oreg., to Wisconsin Bridge & Iron Co.

1200 tons, loft at Madison and Thirty-eighth street, New York, to Harris Structural Steel Co.

1000 tons, Commodore apartments, Euclid avenue and Ford drive, Cleveland, to J. E. Moss Iron Works.

1000 tons, transmission towers for the Appalachian Power Co., Bluefield, W. Va., to the American Bridge Co.

950 tons, building for the Pittsburgh Plate Glass Co., Pittsburgh, to McClintic-Marshall Co.

750 tons, Social Service building, Philadelphia, to New York Shipbuilding Corp.

600 tons, track elevation for Big Four railroad, Indianapolis, to Fort Pitt Bridge Works.

600 tons, ice plant, West Fortieth street, New York, to National Bridge Works.

600 tons, Greenbaum loft building, Thirty-eighth street, to unnamed fabricator.

500 tons, building for Edward Ford Plate Glass Co., Toledo, O., to McClintic-Marshall Co.

500 tons, building for Bedell Co., Cleveland, to McClintic-Marshall Co.

500 tons, Craftsmen's club, Philadelphia, reported awarded to an independent.

350 tons, transmission towers for Portland Railway Light & Power Co., Portland, Oreg., to Pacific Coast Steel Co.

350 tons, bridgework for Pennsylvania railroad, to Belmont Iron Works.

300 tons, municipal building, Germantown, Pa., reported awarded to an independent.

300 tons, warehouse for Western Sugar Co., Oakland, Cal., to Golden Gate Iron Works.

300 tons, round house for Baldwin Locomotive Works for export, to McClintic-Marshall Co.

275 tons, bridgework for Louisville & Nashville railroad, at Evansville, Ind., to Virginia Bridge & Iron Co.

264 tons, train sheds for Union depot, St. Paul, Minn., to St. Paul Foundry Co.

200 tons, hydro-electric power plant of Middle West Utilities Co., Constantine, Mich., to Lakeside Bridge & Steel Co.

200 tons, school No. 12, Bronx, New York, to A. E. Norton, Inc.

200 tons, column cores for Stephen Whitman building, Philadelphia, to McClintic-Marshall Co.

150 tons, building at Onondaga, N. Y., to American Bridge Co.

150 tons, Commercial Arts building, Oakland, Cal., to Herrick Iron Works.

127 tons, miscellaneous material for Chicago & Northwestern railroad, to American Bridge Co.

120 tons for sintering plant, Witherbee, Sherman & Co., Port Henry, N. Y., to Lehigh Structural Steel Co.

STRUCTURAL CONTRACTS PENDING

20,000 tons, Ford Motor Co. plant at River Rouge, Detroit, work in prospect.

8000 tons, Flushing subway extension, New York, new bids asked; Phoenix Bridge Co., successful bidder at the time the job

first came up late last year, withdrew its bid Jan. 29, the board of estimate having taken no approving action.
8000 tons, new building for Buhl Land Co., Detroit; pending.
7800 tons, Statler hotel, Detroit; pending.
7500 tons, Murphy building, Detroit; pending.
5200 tons, bridgework for Long Island railroad; held up indefinitely.
5000 tons, Inquirer building, Philadelphia; bids being taken.
5000 tons, Philadelphia Reading terminal, Camden, N. J.; bids being taken.
5000 tons, annex and additional stories and sub-basements for the Fair store, Chicago; bids being taken.
4200 tons, Elks club, Philadelphia; bids in March 14 for general contract.
4000 tons, Interstate garage, Chicago; bids asked.
3500 tons, George Washington high school, New York; reported placed, still pending.
3000 tons, Lincoln drive apartment, Philadelphia; bids to be asked soon.
2650 tons, elevator for Baltimore & Ohio railroad, Locust Point, Maryland; bids opened April 3 by John S. Metcalf Co., engineers, Chicago.
2500 tons, Milwaukee Elk's temple, Milwaukee; bids March 29.
2400 tons, Jewish hospital, St. Louis; bids asked.
2000 tons, textile plant in South Carolina; Lockwood Greene & Co., Boston and New York, engineers in charge.
2000 tons, power plant for Edison Co., Weymouth, Mass.; expected to be closed early in April.
2000 tons, Columbia Steel Corp., Provo, Utah; bids asked.
2000 tons, Bloomfield building, Chicago; bids asked.
2000 tons, plant for Metal & Thermit Corp. at San Francisco; bids asked.
1800 tons, apartment, Nineteenth and Walnut, Philadelphia; pending.
1500 tons, building for Columbian Mutual Life Co., Memphis, Tenn.; new bids asked.
1300 tons, plant addition for General Electric Co., Schenectady, N. Y.; bids asked.
1200 to 1400 tons, Maine Central railroad bridge, reported within past few days as placed; pending.
1000 tons, Y. M. C. A. building, Philadelphia; bids in March 13.
1000 tons, loft building, Thirty-seventh street, New York; bids asked.
600 tons, power house addition for General Electric Co., Erie, Pa.; bids in.
500 tons, Home Savings Bank, Toledo, O.; bids asked.
500 tons, office building, Portland, Me.; bids being taken.
300 tons, bank building, Richmond, Va.; bids asked.
300 tons, building for the American Window Glass Co., Jeannette, Pa.; bids being taken.
300 tons, bridge, for Northern Ohio railroad; bids being taken.
250 tons, H. B. Smith foundry, Westfield, Mass.; bids being taken.
200 tons, buildings for the Pittsburgh Engineering Works, Jeannette, Pa.; bids being taken.
200 tons, building in Texas for American Smelting & Refining Co., New York; bids asked.
157 tons, Edison plant, Chadham street, Boston; general contract let. Steel bids in.
150 tons, forge shop for Clifford Jacobs Forging Co., Champaign, Ill.; bids asked.
150 tons, pattern storage building for National Malleable Castings Co., Cleveland; project abandoned.

Strip Backlog Heavy

STRIP PRICES, PAGE 846

Pittsburgh, March 20.—Backlogs of strip steel business are so heavy, many makers are refusing additional business. Numerous second quarter contracts having been taken for both hot and cold-rolled strip at 3.05c and 4.75c, base Pittsburgh, respectively. When additional tonnage is taken it usually comprises small lots from regular customers and in such cases higher prices are paid. A large order involving several hundred tons of hot-rolled strip steel was taken the past week at 3.30c, base, and different lots of cold-rolled have carried figures from 5.00c to 5.25c. These levels are indicative of what the quotable market would be if makers were in a position to accept all the business offered. When customers desire to place unusually large specifications no definite figure is named and prices at time of delivery some weeks or months hence apply.

Rail Materials Stronger

Track Accessories, Particularly Spikes and Tie-Plates, Move in Good Volume—Car Orders Show Some Improvement

RAILROAD TRACK MATERIAL PRICES, PAGE 846

New York, March 20.—A feature of the eastern railroad equipment market is the purchase by the Baltimore & Ohio of 75 locomotives, 50 going to the Baldwin Locomotive Works and 25 to the Lima Locomotive Works. The Baldwin Locomotive Works also has booked orders for one locomotive for each of the following companies: Philadelphia Electric Co., Detroit Edison Co., Siboomook Lake & St. John, Chicago, Wilmington & Franklin Coal Co. and Wisconsin & Arkansas. The American Locomotive Co. has received an order from the Ann Arbor for five, and three from the Litchfield & Madison. Car buying continues relatively light.

Railroad Car Buying is Light

Chicago, March 20.—Inquiry for cars coming out during the present week totals about 5000, requiring 95,000 tons of steel and 23,000 axles, with one lot of 4000 from the Erie railroad and the remainder in small lots. An inquiry for 600 stock cars is being held confidential.

Track fastenings continue active and mills are being called on to take considerable tonnage in addition to the large obligations already assumed. Spikes and bolts are in heavy demand and one inquiry out for tie plates asks 3000 tons. Only fair demand exists at Chicago for light rails, although the eastern market is much more active. Light rails have been advanced $2 per ton to 2.25c, mill.

Selling Rate Changes Little

Pittsburgh, March 20.—As was the case rails show little or no change. Not enough activity is noted to warrant an advance commensurate with those being inaugurated in the more active items in the steel market; hence, the light rail market continues quotable at 2.15c to 2.25c, base Pittsburgh.

The track accessories market has been unusually active of late, large orders for both spikes and tie plates having been taken. One maker here reports the receipt in the past week or 10 days of an aggregate of 20,000 to 25,000 kegs of railroad spikes. A few lots of tie plates each involving several hundred thousand plates likewise have been taken. Accumulations are so heavy that one or two makers, including Dilworth, Porter & Co., seriously consider withdrawing from the market for the time being. The Pennsylvania railroad at Philadelphia has been ordering spikes and that system at St. Louis now is in the market for 500,000 tie plates. Because makers are well filled up into the third quarter, many railroads are becoming alarmed about getting material as needed and are sending personal representatives in an effort to speed shipments. Prices are standing unchanged, standard spikes being quoted at 3.15c, small railroad spikes at 3.75c, boat and barge spikes at 3.50c, tie plates at a minimum of $52 per ton, and track bolts at 4.00c to 5.50c, base Pittsburgh.

Track Materials Orders Large

Philadelphia, March 20.—The Philadelphia Rapid Transit Co. has placed large orders for track supplies during the past week. Railroads in this territory continue to place substantial orders for track supplies and miscellaneous materials.

CAR ORDERS PLACED

Midland Refining Co., 100 tank cars, to the Standard Tank Car Co.
Chicago & Northwestern, 40 tank cars, to American Car & Foundry Co.
Seaboard Air Line, 1000 underframes to Pressed Steel Car Co.; 800 gondolas to Standard Steel Car Co.; 200 gondolas to Newport News Shipbuilding & Drydock Co.
Fruit Growers Express, 1000 steel underframes to Pressed Steel Car Co.; 1000 steel underframes to Keith Car & Mfg. Co.
Union Oil Co. of California, 105 tank cars to Standard Tank Car Co.

CAR ORDERS PENDING

Missouri Pacific, 15 baggage and mail cars.
Erie railroad, 2000 box cars and 2000 gondolas; pending.
Denver & Rio Grande Western, 100 narrow-gage stock cars; pending.
Toledo, St. Louis & Western, 100 flat cars; pending.
Iroquois Coal Mining Co., 50 mine cars; pending.
Pennsylvania Coal & Coke Co., 100 mine cars; pending.
Brooklyn Rapid Transit, 500 passenger cars; bids asked.
Boston Elevated railway, 200 passenger cars; bids asked.

Tin Plate Shipments

Still are Large; New Orders Small; But Specifications Heavy

TIN PLATE PRICES, PAGE 846

Pittsburgh, March 20.—Little new demand has opened up for tin plate but shipments still are heavy and specifications are coming in regularly. The bulk of the tonnage produced is being devoted to packers' cans such as food containers although some of the output is being made up into oil, paint and varnish cans as well. Independents in this district are operating on an average of 90 per cent of capacity while the American Sheet & Tin Plate Co. was able to increase its average slightly this week to a basis of 84 or 85 per cent. Its price of $4.95 per base box still is nominal in the absence of any announcement regarding third quarter levels. Independents have quoted as high as $5.75 and $6 but so far as can be learned no business has been taken on those bases, leaving the market quotable at $4.95 to $5.50 per box of 100 pounds, base Pittsburgh.

Manganese Ore Higher

New York, March 20.—A further advance in the manganese ore market is reflected in business of the past week. Two cargoes of Caucasian ore have been sold at 41 cents per unit, c.i.f. tidewater for washed ore, ranging from 53 to 54 per cent, and 37 cents per unit, c.i.f. tidewater for ordinary ore running about 48 per cent. Sales of Caucasian ore comprise all the business that has been transacted lately in the manganese ore market. Efforts to secure offers of Indian and Brazilian ore have not been availing.

Building Bars in Demand

Warehouse Material Used in Majority of Jobs as Mill Bookings Become Heavier—Some Prices Are Advanced

REINFORCING BAR PRICES, PAGE 846

Pittsburgh, March 20.—Inquiries for reinforcing bars continue to increase from week to week but the largest single one now before the trade here is the Wheeling, W. Va., filtration plant involving in excess of 700 tons. The 510-ton lot required for the power house of the Pennsylvania railroad at Juniata, Pa., was awarded to the Concrete Steel Co., Pittsburgh. Estimating departments all are busy on the large number of small jobs current involving 15 or 25 tons apiece. A large amount is wanted for the Toronto, O., filtration plant, approximately 300 tons, and about 100 tons is involved in the building for the American Window Glass Co., Jeannette, Pa. While 2.25c to 2.50c, base Pittsburgh, are the mill prices, 2.75c, the warehouse price figures largely in deals closed and pending because deliveries from the mills are too uncertain.

Current Business From Warehouse

New York, March 20.—Concrete reinforcing bar lettings in this territory increased somewhat in volume during the past week. It is now difficult to get a mill quotation accompanied by any definite promise of delivery. Owing to the fact that the mills are sold ahead so extensively, most of the current business is being placed for shipment out of warehouse stocks. The prices being done on these warehouse shipments range from 2.75c, base Pittburgh, minimum, to 2.90c and 3.00c, base Pittsburgh, for shipment out of local stocks.

Prices Continue Advance

Detroit, March 20.—Continued advances in prices of concrete bars has not deterred builders in this district. Bars are selling at 2.75c, base Pittsburgh, with quotations slightly lower on large tonnages.

The proposed new Aubin Terminals for this city will require about 3000 tons of reinforcing bars. Work on this project is expected to begin within 30 days. Contracts for the new laboratory building of the Ford Motor Co., at Dearborn, Mich., calls for 200 tons of bars, which was let to the Truscon Steel Co. The Truscon Steel Co., also obtained the contract for 800 tons of bars for the new Flint, plant of Durant Motors, Inc., of which the concrete foundation has just been finished. This plant is expected to be in operation by August.

Small tonnage requirements for remodeling work and plant extensions recently let, total about 500 tons.

Big Bar Tonnage Moving

Chicago, March 19.—In spite of the large tonnage of reinforcing bars closed just before prices were advanced last week, good business continues to come to sellers and the total tonnage booked during the past week is large. Most of this is in small lots under 100 tons each, this class of business furnishing the major portion of bookings. A considerable number of projects requiring more than 100 tons each continues to be booked, although the list of prospective tonnages of this size does not diminish. New projects of this sort are coming to the front constantly, and every prospect for continued demand is present. Prices are firm at 3.00c, Chicago, store and no tendency toward shading is noted.

Small Business Continues Good

Cleveland, March 20.—Although little tonnage has been placed during the past week, inquiries, particularly those for small tonnages, continue in good volume. Much of the small business closed is being covered from warehouse stocks to avoid delay. The 150 tons of bars required for the new Bedell building, Cleveland, was placed with the Bourne-Fuller Co. while 180 tons for expansion work for the Ohio Boxboard Co., Wadsworth, O., will be furnished by the Jones & Laughlin Steel Corp. Mills are heavily booked for some time ahead and deliveries are becoming more uncertain. Prices have shown no change over a week ago, both new and rail steel bars being quotable at 2.25c to 2.35c, base Pittsburgh.

CONCRETE CONTRACTS PLACED

Awards reported this week..... 10,361 tons
Awards reported last week..... 13,015 tons
Awards reported two weeks ago.... 3570 tons

2000 tons, Cincinnati terminal warehouse, to Laclede Steel Co. and Corrugated Bar Co.
800 tons, plant for Durant Motors, Inc., Flint, Mich., to Truscon Steel Co.
800 tons, City Investing building, Washington, to Concrete Steel Co.
750 tons, Temple Bar building, Cincinnati, to Pollak Steel Co.
600 tons, reservoir, St. Paul, to Corrugated Bar Co.
550 tons, hydroelectric plant at Sanford, Mich., to Concrete Steel Co.
510 tons, powerhouse for Pennsylvania railroad, Juniata, Pa., to the Concrete Steel Co.
500 tons, De Vilbiss building, Toledo, O., to Concrete Steel Co.
500 tons, footings for Cincinnati terminal warehouse, to Pollak Steel Co. Reported last week as tonnage not known and awarded to Ferro Concrete Steel Co.
400 tons, Illinois highway work, to Kalman Steel Co.
400 tons building for Institute for the Blind, New York, to Truscon Steel Co.
275 tons, hotel at Fort Hayes, Ind., to Concrete Steel Co.
250 tons, building addition for Viscose Co., Marcus Hook, Pa., to Concrete Steel Co.
210 tons, dam at Clarion, Pa., to Concrete Steel Co.
200 tons, building for Greenville Mill & Elevator Co., Greenville, Tex., to Corrugated Bar Co.
200 tons, laboratory for Ford Motor Co., Dearborn, Mich., to Truscon Steel Co.
200 tons, Wisconsin highway work, to Concrete Steel Co.
200 tons, school No. 4, Baltimore, to Hartmann, Duncan & Rogow, Inc.
180 tons, building for Ohio Boxboard Co., Wadsworth, O., to Jones & Laughlin Steel Corp.
150 tons, Bedell building, Cleveland, to Bourne-Fuller Co.
136 tons, wharves 175 and 176, Los Angeles harbor commission, to Leyellyn Iron Works.
125 tons, Pettit storage warehouse, Ft. Wayne, Ind., to Hugh J. Baker.
125 tons, Underwriters Exchange building for S. E. Tate Printing Co., Milwaukee, to Concrete Engineering Co.
100 tons, St. Anthony hospital, Louisville, Ky., to Truscon Steel Co.
100 tons, Missouri-Pacific railroad, St. Louis, to Laclede Steel Co.
100 tons, Mercy hospital, Cedar Rapids, Iowa, to Kalman Steel Co.

CONCRETE CONTRACTS PENDING

3500 tons, grain elevator, for Baltimore & Ohio railroad, Baltimore; pending.
3000 tons, New Aubin Terminals, Detroit, pending.
2000 tons, Montebellow filtration plant, Baltimore; general contract to Carozza-Rowe Co.
2000 tons, elevator for Baltimore & Ohio railroad, Locust Point, Md., taking bids April 3.
800 tons, Montreal Insurance Exchange building, Montreal; pending.
700 tons, filtration plant, Wheeling, W. Va.; bids close March 28.
700 tons, Livermore hospital, San Francisco; pending.
500 tons, bridge at Manchester, N. H.; bids in March 20.
350 tons, Commodore hotel, Chicago, bids asked.
335 tons, Wisconsin highway commission, Madison street bridge, Eau Claire, Wis.; bids in March 22.
300 tons, filtration plant, Toronto, O.; bids close April 10.
200 tons, road work for state of Kentucky; bids in April 2.
125 tons, parochial high school, Evansville, Ind., bids asked.
100 tons, plant for American Window Glass Co., Jeannette, Pa.; bids being taken.

Wire Demand

Exceeds Mills' Production—Much Business Declined for Second Quarter

WIRE PRICES, PAGE 846

Pittsburgh, March 20.—Demand for wire products continues in excess of the mills' power to serve. Makers are booked up for the entire second quarter and are turning down three or four times as much business as they are booking. All forms of manufactures of bright wire are in strong demand, as are nails. Operations are around 80 per cent and with the present shortage of various forms of unskilled and skilled labor, wire products makers are booked further into the future than they at first thought. Numerous orders have been taken for large tonnages of various wire products and single carloads as well as mixed carloads from jobbers are undiminished. Prices continue unchanged with wire at 2.65c to 2.75c and nails at 2.90c to 3.00c, Pittsburgh. The producer which is quoting the 3.00c price on nails closed at 2.50c on cement-coated nails although the market seems to be fairly represented by the 2.60c figure. Demand for these is somewhat slack althqugh reports from more distant points indicate a heavier consumption than earlier in the year.

Producers Directing Sales

Chicago, March 20.—The leading producer of wire and nails here is in the market in only a limited way, taking no new accounts and holding down tonnages to regular customers. This is being done in an effort to get back to a better delivery schedule. Due to the present situation, demand for new business is slightly less, but this is regarded as a reflection of the policy of most sellers. Production of wire and nails is about 80 per cent of capacity. Prices are unchanged, with nails at 2.80c, Pittsburgh, and plain wire at 2.65c, Pittsburgh, on the part of the principal producer, while some others are quoting 2.90c to 3.00c, Pittsburgh, on nails.

The Hartford Iron Works, Inc., East Hartford, Conn., iron founder, has filed a voluntary petition in bankruptcy with liabilities of $71,255 and assets of $65,777. William A. Clinton, West Hartford, is president and treasurer.

Western Demand Active

Inability of Jobbers To Procure Material Hinders Building Operations —Southern Pig Iron Becoming a Factor—Pipe Demand Heavy

SAN FRANCISCO, March 17.—The local market for iron and steel products has witnessed further price advances in most lines and the general tone is one of extreme firmness. Several building projects have been deferred on account of the inability of fabricators to obtain plain shapes from the mill. Los Angeles reports that permits issued up to and including March 6 numbered 1130 and totaled $3,586,407 as compared with 905 permits and an estimated valuation of $3,099,107 for the corresponding period in February.

Pig Iron and Coke

No large tonnages of pig iron have been contracted for in this market this week. Prices on English and Scotch pig have stiffened and southern iron is again becoming the factor. One dealer is inquiring for 1500 tons of southern material. The lowest verified price for No. 2 southern is $26, base Birmingham, and the trade is expecting an advance of from $1 to $3 a ton. Coke is moving only in small lots.

Bars, Plates and Shapes

Local bar mill operators report a slight falling off in bookings. Numerous lettings of concrete bars in small lots are noted. No action has yet been taken on the 2050 kegs of heat-treated track bolts for the Southern Pacific Co. The Bethlehem Steel Co. has withdrawn from the market as far as plates are concerned. The minimum price is 3.00c c.i.f. San Francisco and prompt shipment is not obtainable under 3.10c. The Petroleum Midway is inquiring for another 20 80,000-barrel tanks involving 6000 tons. No action has been taken on the 1000 tons for the Great Western Power Co.'s penstock. The Hetch Hetchy pipe line will be up for figures in the near future, 28,000 tons involved. Bids will be opened March 24 by Everett, Wash., for a pipe line involving 200 tons.

The Bethlehem corporation is out of the market on plain shapes as is the Jones & Laughlin Steel Corp. and while the leading interest will accept business no delivery date is being specified. One independent mill has advanced prices to 3.00c, Atlantic seaboard.

Other Finished Material

Seattle will open bids on March 23 for 700 tons of girder rails and 150 kegs of track spikes. Several of the independent sheet producers have opened their books for second quarter delivery. The minimum price is 3.00c, 3.60c and 4.75c Pittsburgh for blue annealed, black and galvanized sheets respectively, while some are quoting 3.10c for blue annealed, 3.85c for black and 5.00c for galvanized sheets.

Demand for wire rope both from logging camps and oil fields is heavy and exceeds, by far, the supply. Nails are active and mills continue to make allotments on this class of material. Prices c.i.f. San Francisco for brilght nails are 3.50c, cement coated 2.80c and bright hard wire 3.30c.

No letup in demand for tubular goods is noted and deliveries have become more extended. Stocks of standard pipe are low and badly broken. Oil field operations reported to the state oil and gas supervisor for the week ending March 10, show 35 new wells started as compared with 24 during the previous week. Total this year to date is 304, total same date last year 235. Deepening or redrilling jobs numbered 20, as compared with 14 during the preceding week. Total to date this year 156, total same date last year 149. The American Cast Iron Pipe Co. secured 1200 tons of 4 to 12-inch pipe for Glendale. The United States Cast Iron Pipe & Foundry Co. took 462 tons of 30-inch for Pasadena. The Central Foundry Co. was awarded 150 tons of 4 to 8-inch for the Dolbeer & Carson Co., Eureka.

Old Material

Movement of melting steel in this district continues in a fair volume, one lot of 2000 tons going at $14 f.o.b. cars producer's plant. Prices are firm at from $14 to $15.50 delivered mill. Cast iron scrap is being held at around $26 a ton.

Warehouse Market

Reflecting recent mill advances, new prices on several items have been announced in San Francisco as follows: bars from 3.50 to 3.65c, plates and shapes from 3.60c to 3.75c, blue annealed sheets No. 10 gage from 4.50c to 4.75c, cold rolled from 5.15c to 5.30c and bands from 4.15c to 4.30c.

Northwest Market Firm

SEATTLE, March 17.—Firmness and optimism are still the outstanding features of the iron and steel trade in this territory. Local jobbers' prices have advanced to correspond with mill quotations. The turnover of all classes of materials is increasing. Building continues active while improvement and repair work is now in full swing. Lumbering and other basic industries are operating almost to capacity.

Pig Iron and Coke

Consumption of these materials is on the increase in Washington and Oregon as evidenced by the strong demand and larger turnover. Firmness is apparent in both markets. Rising exchange and elimination of the Ruhr supply have resulted in a general advance of $2 on foreign pig iron in this district. The best grades of United Kingdom iron are now being quoted at $38. Notwithstanding the firmness of the market, southern iron is unable to enter this territory on a competitive basis and only British and Scotch iron are available. Foundries and other industries are stocking up on Fernie coke in anticipation of a possible strike at the British Columbia mines next month. There are indications of a strike among union coal mines in Washington.

Bars, Plates and Shapes

These items are moving in large volume. No foreign bars are being brought in. Representatives of French and Belgian mills have had no recent quotations but their latest figures, subject to cable confirmation, are 1.90c or 2.20c duty paid here for steel bars.

The Pacific Coast Steel Co., effective March 15, raised the price of merchant bars from 2.85c to 3.00c. The local mill is operating three of the four open-hearth furnaces and has sufficient orders to keep busy for 60 to 90 days. The company has no fixed price on reinforcing bars, each job being figured on its requirements.

For some time the Pacific Coast Steel Co. has been catering more attentatively to the domestic market because of better prices reinforcing steel having been quoted on a basis of 2.85c. Foreign buyers offered lower prices but within the last two weeks China has been increasing its offers. Today two orders of 100 and 500 tons respectively were received at figures which the foreign market would not have considered last month. Another inquiry for 600 tons of reinforcing material has also come from China and it is evident that foreign buyers are now ready to pay the equal of domestic prices.

Other Finished Material

Jobbers state that local prices are again out of line and increases are justified. It is expected that higher prices will also apply to sheets. Everything in stock is being sold readily and the turnover is large, although no individual orders are of particular size. Building hardware and steel, spikes, nails, sheets, machinery and logging supplies are particularly active.

Old Material

Sources of scrap are being closely inspected for additional stock. Prices are advancing in proportion to supply and demand. Mixed country steel scrap is strong at $13 while railroad steel scrap is quoted at $15 to $16. Local buyers are outbidding the foreign market, the mills and foundries taking all available supplies. The same is true of cast iron scrap which is strong at $26 to $27 representing a material advance in the last 30 days.

Advises Less Public Work Now

Secretary Hoover Believes Governmental Construction Should Be Reserved Until Private Demands Are Satisfied—Would Avoid Inflation, Serve as Stabilizer—Business Cycle Committee Urges Wider Use of Statistical Matter

WASHINGTON, March 20.—Secretary of Commerce Hoover's recommendation to the President that the government at this time continue or initiate only the most urgent public construction because of the tremendous private demands upon the building industry comes, in effect, as a foreword to the forthcoming report of the committee on business cycles which was set up as the result of the general unemployment conference of September, 1921.

The committee is expected to advise precisely what Mr. Hoover has, that in times of building boom the government should get out of the market, thereby not only eliminating the governmental competition that would send labor and materials still higher but also receiving government construction for the days when private building is at an ebb, labor and materials are cheaper, and general employment conditions require the taking up of some slack.

The committee also is to recommend the broader use of statistical matter and charts and urge a widening of the government's efforts in compiling and issuing such data. The committee believes it inadvisable for any agency to be set up to state at what time inflation has begun and at what time a depression is in the offing. It is certain that business can be greatly helped if it is provided data on basic conditions and is instructed how to read and interpret the data.

Favors Use of Statistics

One hundred per cent production is held to be full restoration in any industry. Inflation begins at 101 per cent, it is contended. Even with a great mass of statistics available it will be difficult to discern whether an industry is on the tableland of full production or has hopped off on a balloon ascension. The committee believes that the greatest help to industry would be to develop basic statistical data, teach industry how to read it, and then put it up to industry to read the danger signals and act accordingly. While the report will be a generality and not be predicated upon present conditions in industry, still it will be coming at a propitious moment. Owen D. Young, of the General Electric Co., is chairman of the committee.

Mr. Hoover's recommendation to the President is not to be construed as a "bearish" emanation. It is, rather, a desire for the government to step aside and permit labor and materials to flow into private projects and fill up the hollows created by the war. As Mr. Hoover sees it, wherever there is a peak there must also be a valley. The government's function, he believes, it to try to level off the peaks and fill up the valleys. So whatever government construction is taken off the peaks will assist in filling up the valleys.

After citing that the activity of 1922 greatly reduced stocks of building material, that "labor in the construction trades and in the manufacture of material is not only at full employment but there is actually a shortage in many directions" and that "transportation facilities available for building materials are fully loaded and almost constant car shortages are complained of with consequent interruption of production," Mr. Hoover states in his letter to the President:

"My conclusion from all this is that, at least for the next several months, the trades will be fully occupied in private construction, all of which is generally needed by the country. For the government to enter into competition at the present time will give no more additional employment to labor and no additional production of materials but it must in the broad sense in the end displace that much private construction. The governments, nationally and locally, are in a much better position to hold construction work in abeyance than are private concerns, and are in better position to speed up in times of less demand, as we did in the last depression as the result of the unemployment conference. We can by this means contribute something to a more even flow of employment not only directly in construction work but in the material trades. I would recommend, therefore, that you direct the different divisions of the government to initiate no new work that is not eminently necessary to carry on the immediate functions of the government, and that there should be a slowing down of work in progress so much as comports with real economy in construction, until after there is a relaxation in private demands."

Mr. Hoover is the third high government official to speak his mind upon present conditions in industry. Secretary of the Treasury Mellon has placarded himself a confirmed optimist. Ethelbert Stewart, commissioner of labor statistics, has advised producers "to make hay while the sun shines but buy no more meadows."

Indications of Prosperity

The American Railway association, which has reported record-breaking freight loading by the railroads every week of 1923 to date, believes that all loading records will be broken this year. In October, 1920, the railroads loaded 1,018,000 cars of freight in a 7-day period. In October, 1922, the railroads came within 4000 cars of equaling the record. Some officials of the association believe October, 1923, will see a 7-day period freight loading up to approximately 1,140,000 cars. At present the railroads are loading more than 900,000 cars a week, and an average 800,000 cars the year round would be satisfactory to any railroad executive.

Bethlehem Heads Predict an Active Year

Present indications are that the plants of the Bethlehem Steel Corp., will operate throughout 1923 to the limit of capacity permitted by labor and transportation, according to a joint statement by Chairman C. H. Schwab and President E. G. Grace, which accompanied the pamphlet report of the company just made public. At the end of 1922 Bethlehem had $67,510,007 of unfinished business against $50,164,618 one year before. The average number of men employed during the year was 33,816 and wages paid aggregated $50,376,677. The peak war year of 1918 showed 93,964 employed with a payroll of $167,118,484. At the beginning of 1922 steel plants of the company were running at 30 per cent of capacity, the lowest rate in many years, according to the statement of officials. Commencing with March output increased until at the end of the year new business warranted full operations. Net income of the company in 1922 amounted to $4,605,330 against $10,332,804 one year before.

Foreign Steel Demands Heavy

London Offices of American Producers Deluged with Inquiries from Far East, South America, Italy, Scandinavia and Germany—British Mills Offer Earlier Delivery—Pittsburgh Fabricator Inquires Abroad for Angles

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, March 19.—Iron and steel consumers everywhere in the world are turning to the United States and Great Britain for their supplies. Advances in prices thus far have failed to check interest. London offices of American steel producers are deluged with inquiries, chiefly from buyers representing consumers in the Far East, South America, Italy, Scandinavia and Germany. The leading American producers offer delivery in three to five months on exports of finished steel, and this prevents the consummation of many transactions as the British mills are offering many items for delivery in four to five weeks.

Peculiar cross currents are developing in the market. A leading Pittsburgh fabricator is inquiring here for several hundred tons of small angles. A Middlesbrough mill quoted £11 10s

Sterling—$4.70

($54.05) c.i.f. New York. A British firm is inquiring in the United States for 5000 tons of tank plates for a Central American job. Baldwins, Ltd., South Wales, have sold to Germany 5000 tons of plates. Germans are buying British rerolled steel, and Indian railways are buying heavily.

Orders have been placed with British builders for one 8000-ton steamer, two of 4000 tons and two smaller. Two more furnaces at Middlesbrough have been relighted.

The Berlin correspondent of IRON TRADE REVIEW wires: "British shipbuilders have persuaded the French to release 120,000 tons of Ruhr steel ordered by them prior to the occupation. Additional orders for fuel have been placed in America but none for iron and steel. More coke has been bought at $19 c.i.f. Hamburg. Large orders for finished steel have been placed with several central European producers at £13 15s ($64.62) mill."

The French correspondent of IRON TRADE REVIEW wires from Paris: "There is no evidence of direct buying by French or Belgian consumers in America, except for coke. This has been checked by an advance in price to the British level, $18.20, delivered. The Briey iron ore output is 50 per cent of normal. Small lots of foundry pig iron have been sold at 475 francs ($26.45), but iron is no longer obtainable in Belgium for the first half."

British exports of iron and steel in February, not including scrap, amounted to 301,000 tons compared with 353,000 tons in January. Imports amounted to 118,000 tons compared with 129,000 tons in January.

Further price advances are noted in the British market this week. Wire rods are quoted £12 15s ($59.93), an increase of $5.88, at the same rate of exchange. Finished steel prices have advanced in some instances $1 to $6 a ton, and advances of 50 cents to $1.75 are noted on some grades of pig iron.

Advanced Steel Prices Fail To Check Demand

European Staff Special

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,

BIRMINGHAM, England, March 9.—The British iron and steel market is changing constantly and topsy-turvy conditions have developed within the past week. One sign of this is the negotiation by a well-known Glasgow firm for the purchase of 2000 tons of pig iron from America. The negotiation for the delivery of 20,000 tons of skelp is merely a reversion to a prewar trade which was then very important. This is expected, now that the exchange conditions are adjusting themselves and the difference is so small as to make purchases from America an economic proposition.

An interesting development is the reappearance of Germany as a buyer of English steel. Germany is out to buy anything just now, and there seems to be no question either of its ability or willingness to pay. Business has been very quiet in the South Staffordshire area for some time and the surprise of years was the receipt this week by several Staffordshire works of inquiries for rerolled steel running into many thousands of tons. One firm, within a few days was offered orders amounting to 7000 tons.

Scotch steel prices have been advanced by about 10 shillings ($2.35) per ton. There are signs that the Scotch makers are getting together and agreeing on

Sterling—$4.70

prices in general business terms. An important sign of the times is the more strict insistence on time limits in contracts, consumers being called upon to take ordered steel within the specified periods.

The alleged repudiation of contracts by French and Belgian firms crops up from time to time and apparently is very troublesome to some large importers. In the Birmingham area not much has been heard of it. This is a center which takes large quantities from Belgian steelworks and the importers are quite satisfied with the assurances given from Belgium that every effort will be made to deliver material as early as possible having regard to the undoubted difficulties of production and transport on the Continent. A lot of this steel has still to be delivered and if the contracts are carried out the finished steel at present market prices should carry a very comfortable profit to the firms utilizing it.

The pig iron situation has not improved. There is plenty of demand which cannot be satisfied because of the lack of coke. High prices are being asked, especially in the Midland area. For example, one Midland furnace has quoted £1 17s 6d ($8.81) at the ovens for furnace coke. Selling prices have become purely nominal. The highest heard of is £5 5s ($24.67) for Northampton forge pig iron with £5 15s ($27.02) for foundry iron. These are purely nominal figures and iron is practically unobtainable. Producers cannot maintain their deliveries under present contracts.

There is a good deal of resentment among makers of pig iron at the large tonnages of coke being exported. A more drastic policy was advocated by the Wolverhampton chamber of commerce this week when a resolution was carried calling upon the government to intervene to stop the export of coke to the Continent.

In Cleveland three more furnaces have been started, but the supply is insufficient to meet the requirements, and East coast hematite is still practically unobtainable for prompt delivery. Most makers refuse to quote for iron beyond May. The shortage of pig iron is compelling larger use of broken cast iron and various descriptions of machined scrap of doubtful quality. The demands of the Staffordshire forges have now entirely absorbed all the forge pig iron available, this material a short time ago being hardly salable at any price.

The advances in steel prices have not so far arrested the demand. Large works on the Tees are heavily booked and are not ready to take forward

Current Iron and Steel Prices of Europe

Converted into Dollars at Rates of Exchange, March 19

British Market

Home Market Prices. Gross Tons at Works or Furnace.

Corrected to Date by Cable

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	41.13	8 15 0
Sheet bars	41.13	8 15 0
Wire rods	59.93	12 15 0
FINISHED STEEL		
Steel bars, England, ¾ to 3-inch	52.88	11 5 0
Steel bars, England, ¾ to 3-inch, for export	50.53	10 15 0
Plates, ship, bridge and tank, England	47.00	10 0 0
Plates, ship, bridge and tank, England, for export	44.65	9 10 0
Plates, ship, bridge and tank, Scotland	44.65	9 10 0
Plates, ship, bridge and tank, Scotland, for export	42.30	9 0 0
Beams, England	44.65	9 10 0
Beams, England, for export	42.30	9 0 0
Beams, Scotland	44.65	9 10 0
Beams, Scotland, for export	42.30	9 0 0
Sheets, black, 24 gage	61.10	13 0 0
Sheets, galvanized, 24 gage	90.48	19 5 0
Rails, 60 lbs. and over	91.65	9 10 0
Rails, 60 lbs. and over, for export	42.30	9 0 0
Tin plate, base box, 108 lbs.	5.29	1 2 6
Steel hoops	59.93	12 15 0
Steel hoops, for export	56.40	12 0 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	28.20	6 0 0
Hematite, West Coast, Mixed Numbers	27.03	5 15 0
Basic Middlesbrough	27.62	5 17 6
No. 3 Foundry, Middlesbrough	29.97	6 7 6
No. 3 Foundry, Derby, Leicester, Nottingham	24.68	5 5 0
No. 3 Foundry, Northamptonshire	24.68	5 5 0
No. 3 Foundry, Staffordshire	25.85	5 10 0
No. 3 Foundry, Scotch	28.20	6 0 0
Ferromanganese, 76 to 80 per cent	75.20	16 0 0
Ferromanganese, 76 to 80 per cent. for export	75.20	16 0 0
COKE		
Yorkshire furnace	8.23	1 15 0
Yorkshire foundry	8.23	1 15 0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Marks per metric ton
PIG IRON		
Hematite, Oberhausen	32.56	678,300
Foundry, No. 3, Oberhausen	30.97	645,300
Bessemer Stahleisen, Siegen	35.34	736,300
Foundry, No. 1, Oberhausen	31.12	648,300
Luxemburg Foundry	30.49	635,300
COKE		
Ruhr furnace	5.08	105,740
Ruhr foundry	5.23	108,950
SEMIFINISHED STEEL		
Billets	40.18	837,000
Sheet bars	44.02	917,000
Wire rods	Nominal	Nominal
Raw ingots	35.93	749,000
FINISHED STEEL		
Standard rails	49.20	1,025,000
Merchant bars	50.06	1,043,000
Structural shapes	49.63	1,034,000
Ship plates	53.52	1,115,000
Medium plates, 3 to 5 millimeters	63.55	1,324,000
Sheets, below 3 millimeters	72.86	1,518,000
Tin plate	184.80	3,850,000
Plain wire	53.38	1,112,000
Bands and strips	60.53	1,261,000
Sheets below 1 millimeter	79.15	1,649,000

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	36.20	560
Basic bessemer, Lorraine	30.71	475
Foundry, Longwy, No. 3, sand-cast	30.06	465
Foundry, Longwy, No. 3, chill-cast	30.71	475
Ferromanganese, 76 to 80 per cent	74.35	1,150
COKE		
French furnace	8.21	127
German furnace, f.o.b. frontier	12.80	198
French foundry	8.40	130
SEMIFINISHED STEEL		
Blooms	39.76	615
Billets	41.70	645
Sheet bars	42.99	665
FINISHED STEEL		
Standard rails	35.56	550
Merchant bars	51.72	800
Angles	47.52	735
Normal beams and profiles	47.52	735
Plates, ship and tank, 10 millimeters and thicker	51.72	800
Plates, bridge and tank, 5 to 10 millimeters	55.28	855
Sheets, black, 3 millimeters	57.86	895
Sheets, blue annealed, 2 millimeters	58.19	900
Shafting, cold-drawn, 40 to 60 millimeters	71.12	1,100
Bars, 2 per cent nickel steel	108.29	1,675

All prices are f.o.b. furnace or works.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	27.85	500
Basic open-hearth, Belgian	27.85	500
Gray forge, Belgian	15.04	270
Foundry, No. 3, Belgian	30.64	550
Foundry, No. 3, Luxemburg	27.85	500
Foundry, No. 3, Lorraine	28.41	510
SEMIFINISHED STEEL		
Blooms	34.81	625
Billets	36.21	650
Sheet bars	38.99	700
Wire rods	52.92	950
FINISHED MATERIAL		
Standard rails	27.01	485
Merchant bars	41.78	750
Normal beams and profiles	38.99	700
Plates, 5 millimeters and thicker	44.56	800
Sheets, black, 3 millimeters	52.92	950
Sheets, galvanized, 1 millimeter	108.62	1,950
Plain wire	72.41	1,300
Galvanized wire	83.55	1,500
Wire nails	75.20	1,350

All prices are f.o.b. furnace or works.

contracts. There is quite enough business in hand to keep them employed for some months. The rail mills at Barrow-in-Furness, Middlesbrough and South Wales are busier. The railway amalgamations have brought out a lot of new business. Barrow in particular is busy on rail orders and the plant at the United Steel Co. at Workington, has resumed operations.

The higher price of billets fairly reflects the strength of the steel situation. This week the Siemens association of Wales decided to increase the price of tin and sheet bars by 10 shillings ($2.35) per ton subject to the usual rebate of 7 shillings 6 pence ($1.76) making the selling price £8 16s ($41.36). The Ebbw Vale Co. of Monmouth, have re-entered the field and is taking orders for future delivery on the basis of £8 10s ($39.95) at the works. This is equivalent to £9 2s 6d ($42.88), delivered in the Birmingham area and about represents the selling figure for semifinished material. Some quotations vary a good deal. Two South Staffordshire firms quoting for billets name in one case £9 15s ($45.82) and in the other £10 10s ($49.35).

The market for constructional steel is expanding a little. This is about £2 ($9.40), higher than it was in December for nearly every kind of steel entering into construction.

A complete change has come over the finished iron market during the past five or six weeks. The Scottish malleable bar iron makers have advanced their prices 10 shillings ($2.35) per ton, making the basis £12 ($56.40) for crown quality delivered at Glasgow station. The Staffordshire iron trade is reviving and quotations are running up as high as £12 ($56.40) for medium quality iron.

In spite of transport difficulties it is still possible to get Belgian No. 3 iron at £8 17s 6d ($41.71) f.o.b. Antwerp, equal to £10 2s 6d ($47.58) delivered here. The local material with which this competes is £11 10s ($54.05).

Galvanized sheets have not been able to maintain the quotation of £19 10s ($91.65) which is the basis of recent business and sales are now about £19 ($89.30). Business is decidedly quieter but the works have plenty of orders for some months.

Selling values have increased in the tin plate trade, the basis now being £1 2s 6d ($5.28) per box f.o.b., Bristol channel ports.

Export Prices Rise

London, March 9.—According to quotations compiled from customs

manifests by the board of trade, export prices in Great Britain are rising. The figures for January show increases all along the line except for ferromanganese and beams.

The average export prices for January are stated to be as follows:

	Per Gross Ton £ s d	
Foundry pig iron	5 2 0	$23.90
Ferromanganese	14 9 0	67.75
Carbon billets	10 6 7	48.35
Beams	11 0 9	51.70
Plates	10 15 0	50.40
Galvanized sheets	19 3 0	89.80
Tin plate	21 3 0	99.00

Belgian Steel Market Is Disorganized

European Staff Special

Franc—$0.055

BRUSSELLS, March 9.—The Belgian iron and steel market is completely disorganized. One by one the various producers are withdrawing from the market. Rolling mills are beginning to be in need of tonnage and would willingly take on new business if they could obtain semifinished steel products and fuel, but the steel mills find more advantage in exporting their products than in selling to domestic transformers. The coke shortage is acute and stocks are becoming dangerously low. Prices continue to move upward, and it is impossible to give accurate information as to the market or even an average price.

The scrap market is erratic, though the average price may be said to range around 325 francs ($17.85). Negotiations commenced some time ago with the French government in view of exporting coke to France in exchange for scrap have not as yet resulted in an agreement but the idea has not been abandoned. The wage question is still disturbing industry. Employers have advanced the scale in most lines of industry and this has naturally accentuated the rise in production costs. The Commission Nationale Mixte has decided to grant a 5 per cent raise with a minimum increase of 1 franc a day, effective March 1. A second similar increase will be granted later. These increases will more than offset the wage cuts made a year ago. As a result of this action, the Borinage miners have decided to resume work. In the Center and Charleroi basins, where the strikes were less acute, work has been completely resumed.

Pig iron is practically unobtainable. Production at present is about 25 per cent below normal with 37 furnaces blowing, each producing an average of 170 tons daily. Producers are reserving their output for old customers and the few sales made recently were negotiated around 425 francs ($23.30) to 500 francs ($27.50) per metric ton.

The same conditions are noted in the semifinished steel department. Small lots of billets have been quoted 590 francs ($32.40) to 625 francs ($34.30), whereas in January the price was around 385 francs ($21.20). Merchant bars have reached a level which exceeds all previous records, being quoted 700 francs ($38.50) to 725 francs ($39.75) f.o.b. Antwerp. Small structural shapes are quoted around 700 francs ($38.50) while heavy sections can be had for 75 francs ($37.10).

The plate and sheet market is irregular. Basic bessemer plates, 5 millimeters thick, have been quoted 750 francs ($41.20). Plain wire at 1300 francs ($71.50) has nearly doubled since January 1.

Lack of Coke Unsettles French Prices

European Staff Special

Office of IRON TRADE REVIEW,
224 Rue de Rivoli,

Franc—$0.06

PARIS, March 9.—Iron and steel production in France continues to decrease. Prices are being advanced daily. The few producers that still remain in the market will not enter into firm contracts but quote subject to any change in prices of raw materials. Coke is becoming scarce and some consumers have placed orders in the United States. It is reported that American coke is being sold around $16, c.i.f. French port. This is the equivalent of 280 francs per metric ton. Effective March 1, the price of reparations coke has been fixed at 198 francs ($11.88), but the organization which has charge of distributing Ruhr coke to the French consumers is receiving only 20 per cent of the tonnage to which they are entitled under the reparations agreement. A limited number of French blast furnace operators own their own coke ovens in the north of France, and are still able to obtain a proportion of their requirements at 135 francs ($8.10) per ton. This situation accounts for the great difference in prices now being quoted by the mills. Quotations are based on coke at 150 francs ($9) per ton and any increase or decrease in the base cost of coke results in a proportionate increase or decrease in the selling price of iron and steel products.

Phosphorus pig iron is practically unobtainable. Several American concerns who were buying in France several months ago have been searching for additional supplies but their inquiries have failed to arouse interest. One eastern furnace, however, is said to have quoted a domestic customer 470 francs ($28.20) f.o.b. furnace, and a Luxemburg producer named a price of 520 francs ($31.20) f.o.b. frontier on the same lot. Hematite can be purchased, when obtainable, around 550 francs ($33). Foundries are being closed down on account of their inability to obtain raw materials.

Semifinished steel prices are soaring. Open-hearth steel blooms which were quoted by an eastern mill last week at 525 francs ($31.50), based on coke costing 150 francs ($9), are now being offered at 620 francs ($37.20), with coke at 200 francs ($12). Billets have moved up in the same manner from 550 francs ($33) to 650 francs ($39).

Rolling mills cannot meet the demand for finished steel products. Buyers who had protected themselves by contracts now find themselves forced to stand a proportion of the recent increases to secure any tonnage. One large mill in the department of Meurthe and Moselle which possesses coke ovens in northern France quotes as follows, based on coke costing 200 francs ($12) per ton; beams, 730 francs ($43.80); angles, 750 francs ($45) merchant bars, 780 francs ($46.80) to 800 francs ($48). The same concern has sold several lots of tramway rails recently at prices ranging from 650 francs ($39) to 700 francs ($42) per ton. One Lorraine mill recently quoted a firm price of 850 francs ($51) for merchant bars.

A mill in the Center district booked an order last week for heavy open-hearth steel plates at 900 francs ($54) per ton. An eastern mill quotes basic-bessemer plates, three millimeters thick, at 880 francs ($52.80) f.o.b. mill, based on their ability to obtain coke at 200 francs ($12).

Furniture Shipments Drop

Washington, March 20.—Shipments of steel furniture goods declined in February, according to figures received by the bureau of census in co-operation with the National Association of Steel Furniture manufacturers. The daily rate of shipment was slightly higher than in January or December and was the highest since October, 1920.

Total shipments of steel furniture stock goods reported by 22 manufacturers amounted to $1,307,173 in February, as against $1,362,470 in January and $967,125 in February, 1922. Further comparisons are: January, 1923, $1,362,470 as against $983,834 for January, 1922; December, 1922, $1,376,152 as against $1,027,417 in December, 1921.

The J. I. Case Threshing Machine Co., Racine, Wis., reports gross sales of $15,720,716 in 1922, the smallest total in six years. The company reports a general improvement in business.

Steel Corporation Output Gains

Sweeping Improvement of Business in 1922 Reflected in Report of Activities for 1922—Production of Ingots Averaged 71.3 Per Cent of Rated Capacity Last Year—Bookings Now Above Plant Capacity—Earnings Small

MARKED improvement in production and bookings, with a slight gain in the balance of net earnings for 1922, are the outstanding features of the twenty first annual report of the United States Steel Corp., just made public. The increase in ingot output for the year compared with 1921 was 46.7 per cent while net income was only 8 per cent greater. This discrepancy was caused by mounting costs, it is explained by Chairman E. H. Gary. The interruptions in operations due to the coal mine and railroad strikes, the increased cost of coal, together with the 20 per cent increase in wages effective Sept. 1, combined to elevate manufacturing expenses to an extent which was not balanced by the slight advances which took place in selling prices.

Statistics of Steel Corporation Since Founding

Year	Gross receipts	*Net earnings	Balance capital expenditures	Production steel ingots gross tons	Production finished steel for sale, net tons	Shipments finished products, net tons	Number of employes
1922	$1,092,697,772	$109,788,916	$ 23,551,991	16,082,385	11,785,331	11,911,904	214,931
1921	986,749,719	100,791,279	70,091,866	10,966,347	7,860,334	7,958,833	191,700
1920	1,755,477,025	185,095,359	102,956,133	19,277,960	14,228,502	14,098,707	267,345
1919	1,448,557,834	152,290,639	87,091,514	17,200,373	11,997,935	12,243,183	252,105
1918	1,744,312,168	208,281,104	129,855,037	19,583,493	13,849,493	14,124,986	268,710
1917	1,683,962,552	304,161,471	117,977,117	20,285,061	14,942,911	15,370,105	268,058
1916	1,231,473,779	333,574,177	64,680,648	20,910,589	15,460,792	15,542,088	252,668
1915	726,683,589	130,396,011	15,537,431	16,376,492	11,762,639	10,982,748	191,126
1914	558,414,933	71,663,615	28,171,013	11,826,476	9,014,512	9,078,559	179,353
1913	796,894,299	137,121,844	41,999,098	16,656,361	12,374,838	12,168,758	228,906
1912	745,505,515	108,174,673	13,780,361	16,901,223	12,506,619	12,696,935	221,025
1911	615,148,839	104,305,466	49,430,851	12,753,370	9,476,248	9,460,169	196,888
1910	703,961,424	101,054,754	53,101,221	14,179,369	10,733,995	10,727,751	218,435
1909	646,382,251	131,491,414	37,916,250	13,355,189	9,859,660	9,691,290	195,500
1908	482,367,840	91,847,710	49,422,697	7,838,713	6,206,832	7,102,456	165,211
1907	757,014,767	160,964,078	66,981,252	13,099,548	10,376,742	10,451,488	210,180
1906	696,756,926	156,624,273	32,155,146	13,511,149	10,578,433	10,862,425	202,457
1905	535,331,736	110,787,653	24,395,408	11,995,239	9,226,386	.....	180,158
1904	444,405,430	73,176,522	17,957,946	8,406,378	6,792,780	.....	147,343
1903	536,572,871	100,171,152	31,042,135	9,167,960	7,635,690	.....	167,709
1902	560,510,479	133,303,763	16,586,531	9,743,918	8,197,232	.....	168,127
1901	.....	84,779,293	.....	8,854,820	.....	.....	.....

*After federal taxes.

Books Over 90 Per Cent

The aggregate tonnage of orders booked by the corporation in 1922 was slightly over 90 per cent of the capacity of the subsidiary plants. The greater part of this tonnage was entered during the last six months. Since the beginning of the present year new business booked has exceeded the rated maximum capacity of the subsidiary companies, according to statements in the report.

Shipments of all products, save cement, by the corporation in 1922 gained sharply over the previous year. The total was 13,129,600 tons compared with 8,904,904 tons in 1921, an increase of 47 per cent. In 1920 these shipments amounted to 15,891,452 tons. Domestic shipments were 11,831,447 tons against 7,696,747 tons in 1921, an increase of 53.7 per cent. During 1921 domestic shipments slumped to 45 per cent below the total for 1920, and it is seen that a large part of the ground lost in that year was regained in 1922. The record of shipments follows:

	1922 Tons	1921 Tons
Domestic		
Rolled steel and other finished products	10,708,022	6,832,038
Pig iron, ingots, ferro and scrap	273,963	142,715
Iron ore, coal and coke	740,380	618,729
Sundry materials and by-products	109,082	103,265
Total tons all kinds of materials, except cement	11,831,447	7,696,747
Universal portland cement, (barrels)	13,548,544	12,211,285
Export		
Rolled steel and other finished products	1,203,882	1,126,795
Pig iron, ferro and scrap	3,377	978
Sundry materials and by-products	90,894	80,384
Total tons all kinds of materials	1,298,153	1,208,157
Aggregate tonnage of all products shipped to both domestic and export trade	11,911,904	7,958,833
TOTAL VALUE OF BUSINESS (covering all of above shipments, including cement and completed steamships delivered and other business not measured by the ton unit)	1922	1921
Domestic, not including inter-company sales)	$646,592,293	$563,093,812
Export	75,311,489	92,313,756
Total	$721,903,782	$655,407,568

The output of steelmaking subsidiary companies of the corporation for the entire year averaged 71.3 per cent of capacity. This was a gain of 50 per cent over the output in 1921 which averaged only 47.5 per cent of rated capacity. That year marked the low point in ratio of production to capacity in any year since the company's organization. During the first six months of 1922 the average was 57 per cent of capacity. Due to relatively low level of prices prevailing during the year the gross volume of sales gained only 10 per cent over 1921. Total sales, excluding intercompany business, amounted to $721,903,782 against $655,407,568 in the preceding year. Referring to prices the report says:

"The prices received in 1922 for the total tonnage of rolled and other finished steel products shipped, netted $13.52 per ton less than the average price for similar products received in 1921. Export prices averaged $19.70 per ton less than in the year preceding."

Net Earnings Increase

Net earnings and subsidiary bond interest were $101,529,310 against $92,726,057 in 1921, and $176,686,898 two years before. The balance available for dividends at the close of the year amounted to $38,733,417. In 1921 it was $35,530,787. Regular dividends on both common and preferred stocks were declared and this resulted in a deficit for the year of $10,981,346. This was a reduction from the deficit for 1921 of $14,017,784. At the close of 1920, the surplus after dividends amounted to $59,059,000.

Export shipments made a much smaller relative increase than did those for domestic use. The aggregate of foreign shipments was 1,298,153 tons against 1,208,157 tons in 1921. This was a gain of only 7.45 per cent. In 1921 the export business dropped 29 per cent. In both years the foreign trade of the corporation showed smaller fluctuations than did domestic business. The widest gain for any group of prod-

COMPARATIVE INCOME ACCOUNT

For the Fiscal Years ending December 31, 1922 and 1921

	1922	1921	+Increase —Decrease
EARNINGS—Before charging interest on Bonds and Mortgages of Subsidiary Companies			
First Quarter	$21 303 631 59	$34 342 006 44	— $13 038 374 85
Second Quarter	29 330 255 01	23 911 921 99	+ 5 418 333 02
Third Quarter	29 596 455 29	20 916 498 75	+ 8 679 956 54
Fourth Quarter	29 558 574 43	21 620 852 32	+ 7 937 722 11
Total for year	*$109 788 916 32	*$100 791 279 50	+ $8 997 636 82
Less, Interest on outstanding Bonds and Mortgages of the Subsidiary Companies	8 259 605 93	8 065 221 58	+ 194 384 35
Balance of Earnings	$101 529 310 39	$92 726 057 92	+ $8 803 252 47
Less, Charges and Allowances for Depletion and Depreciation applied as follows, viz.:			
To Depreciation and Replacement Reserves and Sinking Funds on Bonds of Subsidiary Companies	33 382 624 09	27 905 045 44	+ 5 477 578 65
To Sinking Funds on U. S. Steel Corporation Bonds	9 305 884 70	8 863 180 35	+ 442 704 35
Net Income in the year	$58 840 801 60	$55 957 832 13	+ $2 882 969 47
Deduct:			
Interest on U. S. Steel Corporation Bonds outstanding	19 232 304 87	19 679 582 49	— 447 277 62
Premium paid on Bonds redeemed, viz.:			
On Subsidiary Companies' Bonds	150 205 98	27 835 57	+ 122 370 41
On U. S. Steel Corporation Bonds	724 873 04	719 626 39	+ 5 246 65
Balance	$38 733 417 71	$35 530 787 68	+ $3 202 630 03
Add: Net Balance of sundry receipts and charges, including adjustments of various accounts	920 037 52	1 086 229 51	— 166 191 99
	$39 653 455 23	$36 617 017 19	+ $3 036 438 04
Dividends on U. S. Steel Corporation Stocks, viz.:			
Preferred, 7%	25 219 677 00	25 219 677 00	
Common, 5%	25 415 125 00	25 415 125 00	
Deficit provided from Undivided Surplus	$10 981 346 77	$14 017 784 81	— $ 3 036 438 04

*Balance of Earnings after making allowances for estimated amount of Federal income taxes.

ucts in domestic shipments was the 91.97 per cent increase for pig iron, ingots, ferro, and scrap.

For the second consecutive year shipments of rolled and other finished products of the Steel corporation exceeded aggregate production. In 1920, the reverse was true. The production of these products in 1922 was 11,785,331 tons and shipments were 11,911,904 tons.

The diminished importance of the export trade in the improvement of 1922 is seen by the fact that the ratio of exports to total shipments of the corporation's products was 9.8 per cent.

Last year's record is in sharp contrast with 1921, when 15 per cent of the company's total shipments went abroad. That reflected the poor home demand and the greater exertions to sell steel abroad evidently put forth by the Steel corporation. In 1920, another active year in domestic trade, the ratio of exports to total shipments was 10.7 per cent, and in 1919 exports were pushed up to 14.2 per cent of aggregate shipments in an effort to counteract lagging sales in this country during the first part of the year.

The companies inventories at the close of 1922 were the lowest shown in any annual report since 1916. The total, after allowing credit for a reserve of $49,460,082, was $220,707,251 a reduction of $20,797,118 from the previous year. In 1916 inventories amounted to $181,901,004.

Two years of failure to earn dividends are reflected in the large reduction in capital expenditures last year. The balance of this item, as disclosed by the report, was only $23,551,991. This was the smallest outlay for improvements and plant expansion made by the corporation in any year since the $15,537,431 of 1915. It is considerably below the average for the prewar years since the company's organization. It is less than one-third of the total for 1921, a year of greater depression than 1922. The high mark for capital expenditures was reached in 1918 with a total expenditure of $129,855,037.

The amount expended for additions and extensions of manufacturing properties during the year was $16,078,739 compared with $36,868,523 in 1921. The company greatly reduced its outlay for vessels. The report shows $1,051,611 was expended for Great Lakes and oceangoing steams against $8,216,000 in 1921.

Among the most important additions to plant finished or put under way in 1922 were the completion of the new rod and wire mill at the Duluth plant of the Minnesota Steel Co.; completion

(*Concluded on Page* 890)

PRODUCTION

OF

RAW, SEMI-FINISHED AND FINISHED PRODUCTS BY SUBSIDIARY COMPANIES IN THE YEARS 1922 AND 1921

PRODUCTS	1922	1921	1922 Increase	
ORES MINED				
In the Lake Superior Region (Iron Ore)	*Tons*	*Tons*	*Tons*	*%*
Missabe and Vermilion Ranges	16 549 588	12 065 390	4 484 198	37.2
Gogebic, Menominee and Marquette Ranges	2 477 672	2 415 802	61 870	2.6
In the Southern Region—Alabama (Iron Ore)	2 545 242	1 941 490	603 752	31.1
In Brazil, S. A. (Manganese Ore)	205 677	225 199	19 522*	8.7*
Total	21 778 179	16 647 881	5 130 298	30.8
LIMESTONE QUARRIED	5 633 186	4 607 486	1 025 700	22.3
COAL MINED				
For use in the manufacture of coke	16 778 413	14 546 103	2 232 310	15.3
For steam, gas and all other purposes	6 515 058	7 081 830	566 772*	8.0*
Total	23 293 471	21 627 939	1 665 532	7.7
COKE MANUFACTURED				
In Bee-Hive Ovens	3 431 846	1 698 178	1 733 668	102.1
In By-Product Ovens	9 805 212	8 127 086	1 678 126	20.6
Total	13 237 058	9 825 264	3 411 794	34.7
BLAST FURNACE PRODUCTION				
Pig Iron	11 885 179	8 547 199	3 337 980	39.1
Spiegel, Ferromanganese and Ferrosilicon	141 984	131 063	10 921	8.3
Total	12 027 163	8 678 262	3 348 901	38.6
STEEL INGOT PRODUCTION				
Bessemer Ingots	4 068 578	2 950 897	1 117 681	37.9
Open Hearth Ingots	12 013 807	8 015 450	3 998 357	49.9
Total	16 082 385	10 966 347	5 116 038	46.7
ROLLED AND OTHER FINISHED STEEL PRODUCTS FOR SALE				
Steel Rails (Heavy and Light Tee and Girder)	1 225 909	1 480 049	254 050*	17.2*
Blooms, Billets, Slabs, Sheet and Tinplate Bars	673 009	409 767	263 332	64.3
Plates	1 410 414	723 355	687 059	95.0
Heavy Structural Shapes	930 733	429 762	466 971	113.0
Merchant Bars, Hoops, Shafts, Light Shapes, Etc	2 456 915	1 125 961	1 330 954	118.2
Tubing and Pipe	1 178 611	984 285	194 326	19.7
Wire Rods	158 495	88 232	70 263	79.6
Wire and Wire Products	1 404 663	915 651	489 012	53.4
Sheets (Black and Galvanized) and Tinplates	1 504 121	1 084 542	479 579	40.8
Finished Structural Work	301 248	272 621	28 627	10.5
Angle Splice Bars and All Other Rail Joints	218 538	168 397	20 141	10.2
Spikes, Bolts, Nuts and Rivets	72 531	60 291	12 240	20.3
Axles	96 403	22 567	73 836	327.2
Steel Car Wheels	78 247	35 101	43 146	122.9
Sundry Steel and Iron Products	69 314	79 753	10 439*	13.1*
Total	11 785 331	7 860 334	3 924 997	49.9
MISCELLANEOUS PRODUCTS				
Zinc	59 818	33 426	26 392	79.0
Sulphate of Iron	32 389	24 490	7 899	32.2
Fertilizer—"Duplex Basic Phosphate"	16 513	14 508	1 005	13.7
Fertilizer—Sulphate of Ammonia	123 118	117 496	5 622	4.8
Ammonia (as Liquor)	3 816	3 626	190	5.4
Benzol Products	119 373	113 354	6 019	5.3
	Bbls.	*Bbls.*	*Bbls.*	
Universal Portland Cement	13 168 000	12 499 000	669 000	5.4

IRON TRADE REVIEW

Registration Applied for

The Authority of Industry National and International

Published Every Thursday by

THE PENTON PUBLISHING CO., CLEVELAND, O.

Member, Audit Bureau of Circulation. Associated Business Papers, Inc., and National Publishers Association

BRANCH OFFICES

BOSTON - - - - - - - - - - - 426 Old South Bldg.
CHICAGO - - - - - - - - - - 1147 People's Gas Bldg.
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LONDON, ENG. - 2-3 Caxton House, Westminster, S. W. 1.
PARIS, FRANCE - - - - - - 23 Rue de la Bienfaisance

Cable Address, IROTRAPEN, London

Subscription, United States, Cuba and Mexico, $6 per year. Canada, $8.50 per year. Great Britain and other countries, £2:0:0 per year.

Entered at the Postoffice at Cleveland as Second Class Matter

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Corporation Report Shows Development

CONVINCING proof that 1922 was a period of improvement in preparation for a year of fullfledged prosperity is to be found in the twenty-first annual report of the United States Steel Corp., which is reviewed in detail in this issue. Analysis of this revealing document gives ample refutation, so far as the steel industry goes, to the theories of some economists that the past year was one of undue price inflation which is about to be punished by an immediate reaction similar to that of 1920.

Although remarkable improvement occurred in the steel trade, it was largely in the nature of a sharp reaction from the unprecedented depression of 1921. In that year production of steel by the corporation sunk to 47.5 per cent of the rated capacity of plants, the lowest level since the organization of the great interest. This was corrected to the extent of reaching an output of 71.3 per cent capacity in 1922.

The lingering effects of the depression were reflected both in prices and in earnings during the year. The report shows that domestic tonnage shipped brought $13.52 a ton less than the year before. Compared with the striking gain in the physical volume of business, net earnings before dividends, made a trifling increase of only 8 per cent. A combination of circumstances including higher coal costs, curtailed operation due to the coal and railroad strikes, the failure of prices to advance in proportion to costs, and the 20 per cent increase in wages caused operating expenses to advance and restrained earnings. Last year the ratio of manufacturing income to gross receipts was 8.9 per cent against 8.3 per cent in 1921. The peak was 21 per cent in 1917 and the prewar average was around 16 per cent.

From this picture it becomes manifest that the Steel corporation has not yet reaped rewards comparable to the recovery. That refers to the past. A glimpse of a more promising future is seen in the record of bookings. During 1922 the corporation booked new business to the extent of 90 per cent of its rated capacity, while new business since the present year began, has been flowing in at a rate in excess of its great producing facilities.

The year marked one of the low points in the matter of capital outlay for plant additions and expansions. The sum of only $23,000,000 was expended and this was the smallest since 1915 and well below the average for prewar years. Confidence of the directing minds of the corporation in the return of good times as well as a firm conviction that plant capacity of the iron and steel industry has not been over-expanded are reflected in the program for 1923. This calls for an expenditure of $65,000,000 during the year.

The Steel corporation's report throughout is a compelling exhibit of the fact that the iron and steel industry has entered upon another period of normal and rational development.

Intelligent Vote Is Needed

MEMBERS of trade associations throughout the country should exercise particular care with regard to the action to be taken by local chambers of commerce and business men's associations on a referendum now being taken by the United States chamber of commerce. This applies to individuals affiliated with trade associations identified with the iron and steel industry.

It appears that trade associations form approximately one-third of the total membership of the United States chamber. Organizations of distinctly civic type make up the other two-thirds. Each organization is entitled to not more than 10 votes, depending upon the number of its members.

Referendum No. 41, as it is called, deals with trade association activities. Members of trade associations are more familiar with the ways in which their organizations function than are busi-

ness men whose affiliations are confined to associations with objectives of civic betterment or the promotion of trade in one community. A local chamber of commerce frequently casts its ballot on a referendum from the national chamber through a committee, or an executive board, or even through the secretary alone. It is possible that many of those who will be entrusted with the casting of the major portion of the ballots will have little or no intimate knowledge of the questions upon which they are voting.

If members of trade associations will ascertain the manner in which the vote of their local chamber of commerce is cast, they may exert a beneficial influence by talking over the questions which are a part of referendum with those who will later be called upon to vote.

There is reason to believe that if the vote on this referendum is unfavorable to the continuance or extension of trade association activities, it will encourage the enactment of legislation unfavorable to trade associations. In that event, the public endorsement which Secretary Hoover has given trade association work may prove to have been in vain, and all that he and others have done to foster the co-operation spirit of much benefit to many industries will be lost.

United States, Manufacturing Leader

INDUSTRIAL America's advance in two generations to the leading position among all manufacturing nations of the world is shown graphically by the National Industrial Conference board's analysis of the United States census of manufacturers for 1919 in comparison with previous government statistics of this character. The total value of manufactured products increased from $1,090,000,000 in 1849 to $62,500,000,000 in 1919; the number of wage earners employed in manufacturing establishments rose from 957,059 to 9,096,372 in the same period. Of each 1000 engaged in gainful occupations in 1899 about 182 were employed in manufacturing industries, while 20 years later the proportion was 260, an increase of 43 per cent. The increase in Michigan was 90 per cent; in Ohio 70 per cent, and in Indiana 69 per cent. During this period there was no increase in the proportionate number of women at work, while the percentage of boys under 17 decreased 60 per cent.

Establishments employing over 1000 in 1919 were less than one-third of 1 per cent of the total number, yet they employed over 26 per cent of the total number of wage earners. Average cost of labor in manufacturing increased from $20.71 per month in 1849 to $96.50 in 1919, an advance of 368 per cent. Total wage costs increased 158 per cent from 1914 to 1919. While the wage cost has been going up steadily, the hours of labor have been diminishing. In 1919 about one-eighth of all those engaged in manufacturing industries were working in establishments operating 44 hours or less per week; nearly one-half in those operating 48 hours or less, and nearly three-fourths in those which did not exceed 54 hours.

The census figures have been studied by the conference board and presented in such a way that they cannot fail to impress the average American with the fact that a continuation of the remarkable progress of the manufacturing industries of the country may be expected. While the war was responsible for a large share of the advance as recorded by the census, the country apparently now is awakening anew to its opportunities in manufacturing. Its economic advantages, personal business capacity and financial strength should preserve indefinitely its position as the world's leading industrial power.

Anthracite Pig Iron Passes

THE END of an era in pig iron production probably was marked by the year 1922, when for the first time since anthracite coal was introduced into blast furnace practice in the United States, no iron was made by that method. According to the official report of pig iron production for 1922 of the American Iron and Steel institute, just issued, only five funaces have been engaged in producing iron with anthracite or mixed anthracite and coke as fuel, and these were idle throughout the entire year. Although the output of anthracite iron has been tapering off for the last 20 years, from nearly 2,000,000 tons in 1903 to but 13,743 tons in 1921, the actual passing of the process is notable.

Charcoal, as generally known, was the first blast furnace fuel used in the United States. In 1839, the first successful operation was obtained using anthracite coal as a fuel. The year 1840 witnessed the first attempt to use bituminous coal, but it was not until 1860 that Connellsville coke was utilized in ironmaking. Within a few years practically no other fuels were used in the Pittsburgh district. Throughout the country, however, the use of coke gained favor slowly. Pig iron made by coke first passed that by anthracite coal in 1875 and from that time forward has been the common fuel of the iron industry. Anthracite iron reached its zenith in 1890 when for the second time the output passed the 2,000,000-ton mark. Today coke pig iron production represents well over 99 per cent of the country's total.

The institute's official figures for 1922 bring out another interesting point in iron production. With a total output of 27,219,904 gross tons, the increase of 1922 over 1921 was 10,531,778 tons, or 63.2 per cent. This gain was the greatest ever recorded in pig iron output. Since iron production in 1922 was nearly 12,000,000 tons below the country's greatest production in 1918, the record increase in 1922 serves to emphasize not the level attained during the year, but the depth to which production dropped in 1921.

No Over-Expansion in Steel

Common Theory Is Refuted by Current Developments—United States Steel Corp. Booking Orders Beyond Capacity—Ingot Production Virtually at War Peak—Car Loadings High and Railroad Earnings Gain

BY JOHN W. HILL, FINANCIAL EDITOR

RECENT developments have completely overturned the formerly widely favored theory that the country's industrial plant had been expanded during the war far beyond normal requirements. This is strikingly true of the iron and steel industry. Evidences that the needs of consumers have grown apace with the industry's ability to produce are to be found in the record of bookings by the United States Steel Corp., and in the February ingot output.

The annual report of the Steel corporation discloses that new tonnage booked during 1922 amounted to 90 per cent of the rated capacity of producing plants. Since the beginning of the current year the flood of new business has exceeded that capacity. Last year the corporation made a smaller outlay for plant expansion and improvements than in any year since 1915. That was due rather to greatly reduced earnings and disturbed operating conditions, as a result of strikes, rather than to any fear that plants were overexpanded. This is shown by the fact that for 1923 it is planned to spend $65,000,000 in new developments.

As shown by the Business Trend chart daily average ingot production in February was near the high mark of 1920, The annual rate during the month was only 1.98 per cent below the record production of ingots in 1917. From the continued vigor of demand it is evident that the country needs all of the steel producing capacity that it has. This is not strange. During the war and post-war period when plant expansion was taking place the total increase in iron and steel, as well as general industrial facilities, was estimated at 40 per cent. Normally the growth of industry is about 4 per cent a year, while another 4 per cent is needed to replace the worn out plant. Over a period of five years this would total 40 per cent. Because of the extremely small industrial building of the last two years, it may develop in 1923 that the country's plant capacity is below rather than above normal. February cotton consumption, on a daily basis, was greater than peak war months. Textile mill machinery activities are greater than ever before. Automobile production is making amazing records, February output being the third highest month on record.

Even more impressive evidence of the present business activity is to be found in freight movements. As shown by the Business Trend chart car loadings for the week ended March 3 touched 917,000, a high mark for that week and the highest figure since early December. Usually freight movements lag at this time of the year. Railroad earnings are rising. In January the rate of return of 5.54 per cent on property valuation was the best showing since the roads were returned to private management. It was double the return for one year before.

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The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One mo. ago	One year ago	1913
Business failures	371	351	395	543	450
Cash ratio Fed. Res. System	75.4	76.2	75.3	75.6	...
Loan rate, 4-6 Mo. N. Y. (per cent)	5-5¼	5	4½-4¾	4¾-5	5½-6
Aver. 20 ind'l shares	$99.66	$99.06	$98.76	$85.23	$78.00
Aver. 20 rail shares	$88.51	$88.78	$89.04	$79.12	$109.00
Ave. 40 bonds	$77.71	$78.01	$79.37	$79.90	$93.00
Car loadings (week ended ——)	917,896	830,223	865,000	803,255	*811,106
Bank debits 241 cities (000 omit'd)	$9,293,613	$10,895,616	$8,383,598	$8,515,167	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	March 19 (close)	Week before	Mo. ago	Yr. ago
Sterling	$4.86	$4.69	$4.70	$4.69	$4.39
Francs	19.3c	6.46c	6.02c	5.96c	9.03c
Lira	19.3c	4.85c	5.18c	4.78c	5.08c
Marks	23.8c	0.0048c	0.0048c	0.0051c	0.35c

MONTHLY COMPARISION

	February	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$235,000,000	$217,365,000	$177,473,000	$71,450,000
Business failures:				
Number	1508	2126	2331	1336
Liabilities	$40,627,000	$44,210,000	$72,608,393	$22,723,000
Exports	$310,000,000	$339,000,000	$250,619,000	$207,000,000
Excess of gold imports	$6,983,647	$24,347,802	$27,000,000	*$630,716
Bureau of Labor Price Index	157	156	141	100
Bradstreet's Price Index	153.7	148.3	125	100
Economist's British Price Index	4402	4324	4259	2717
Cost of Living Index	†158.1	158.9	161.4	100.0
New incorporations	$700,708,000	$909,093,800	$91,404,000	$172,301,000
Railroad net earnings	†$60,654,000	$79,154,000	$29,486,000	$59,900,000

†January. *Monthly average export excess.

The Business Trend

March 22, 1923

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Monthly Business Index, picturing industrial conditions shows further gain in February, although month is usually one of dragging activities; level is 30 per cent above 1913 a gain of 44 per cent over 12 months ago; business now equal to corresponding period of 1920; outlook continues favorable.

FREIGHT TRAFFIC—Total car loadings of 917,000 for week ended March 3 make new record for that week; highest since first week of December and only 100,000 below extreme peak of October.

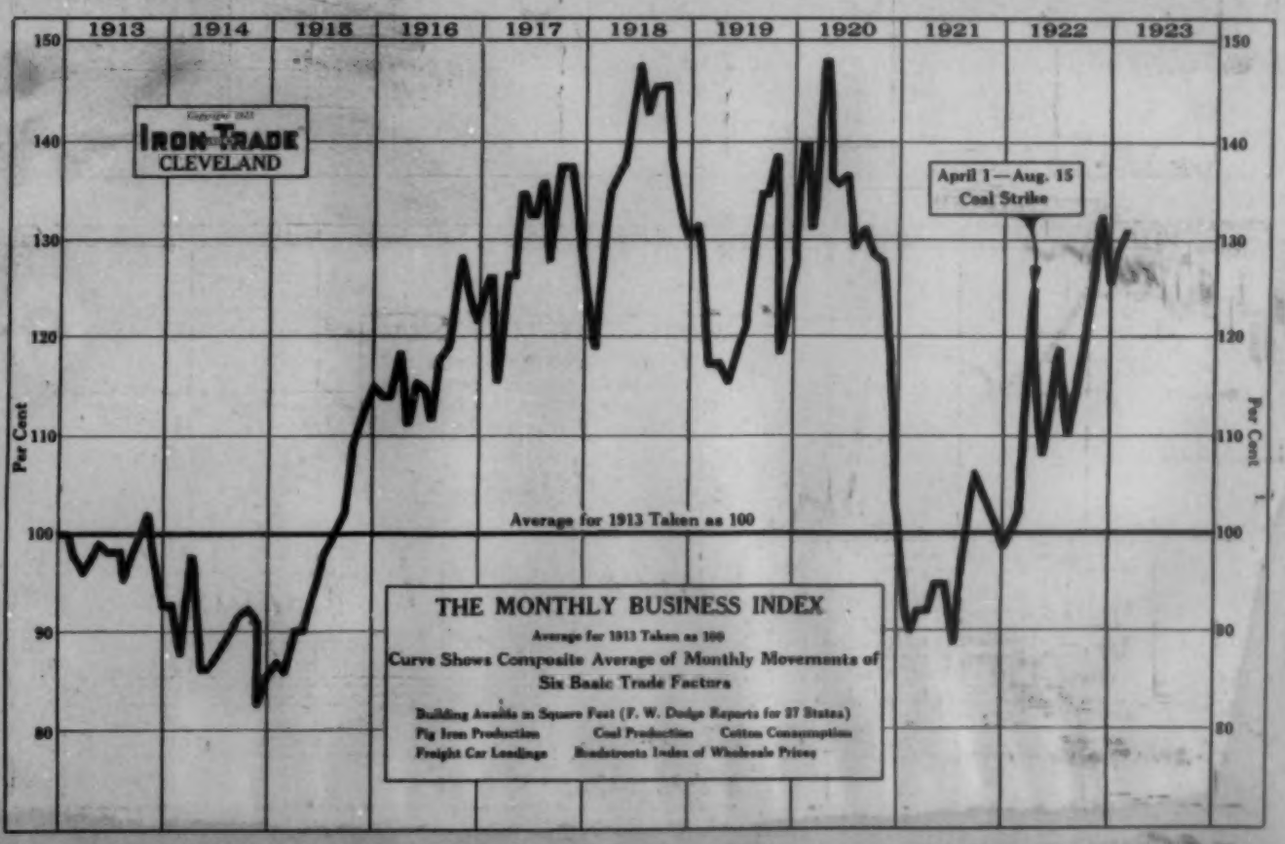
STEEL ORDERS—Unfilled bookings of United States Steel Corp. for Feb. 28 gained 5 per cent over month before and 76 per cent over one year ago; record regarded as reliable trade barometer.

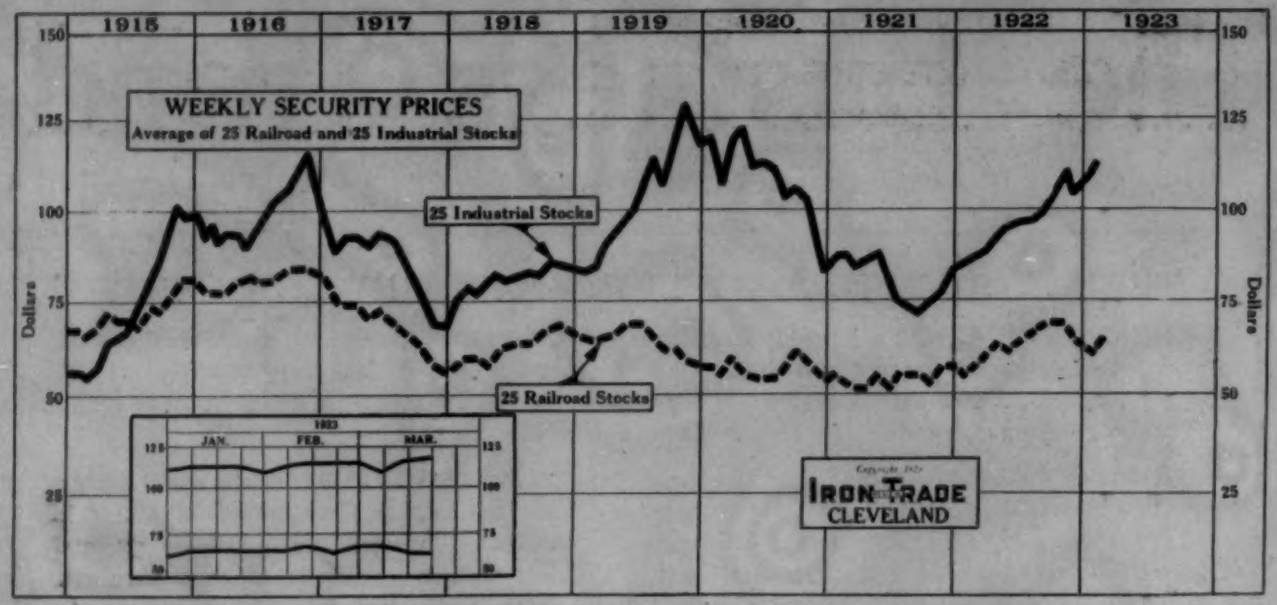
AUTOMOBILE PRODUCTION — February motor output of 270,000 passenger cars and trucks third largest month on record; gain of 12 per cent over January and 132 per cent over February 1922.

RAILROAD EARNINGS—Return of 5.54 per cent on property valuation of Class I roads in January highest since private control was restored; current earnings continue to run high.

BANK CLEARINGS—New chart shows total bank clearings in country, together with clearings for New York City and for all country outside of New York; total gains 14.7 per cent over year ago.

INGOT OUTPUT—Daily average rate of ingot production by months pictured in new graph; annual rate 43,230,000 tons in February, 125 per cent above 1921 output and 98 per cent of high record for all time in 1917.




1915
1916
1917
1918
1919
1920
1921
1922
1923
WEEKLY SECURITY PRICES
Average of 25 Railroad and 25 Industrial Stocks
25 Industrial Stocks
25 Railroad Stocks
Dollars
150
125
100
75
50
25
1923
JAN.
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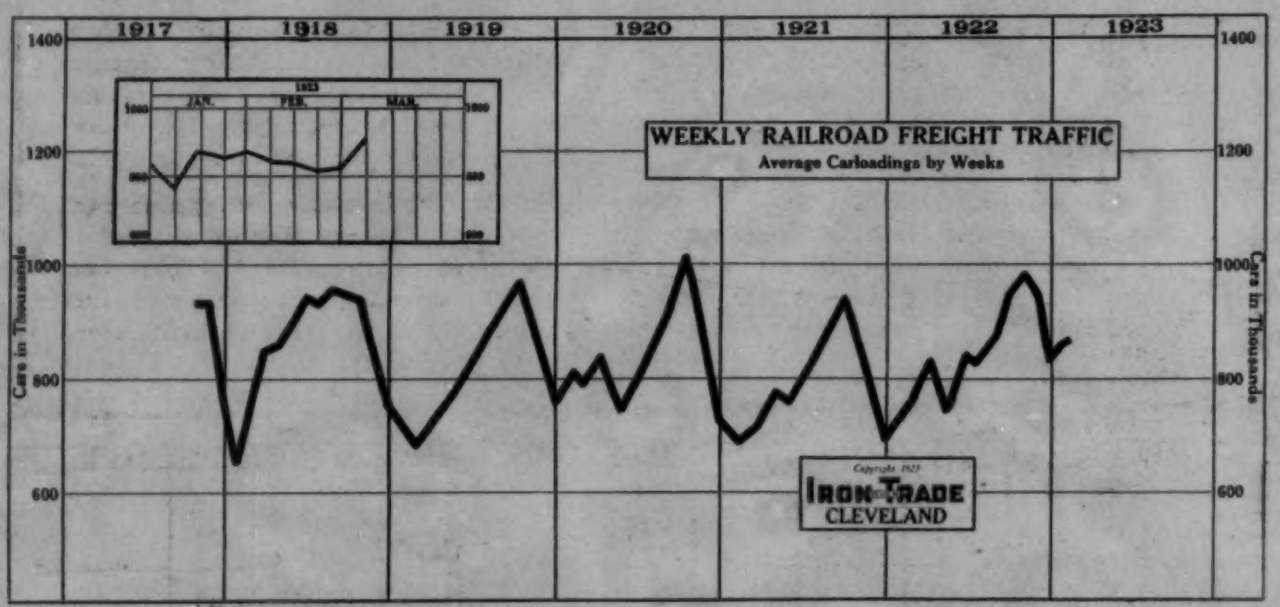
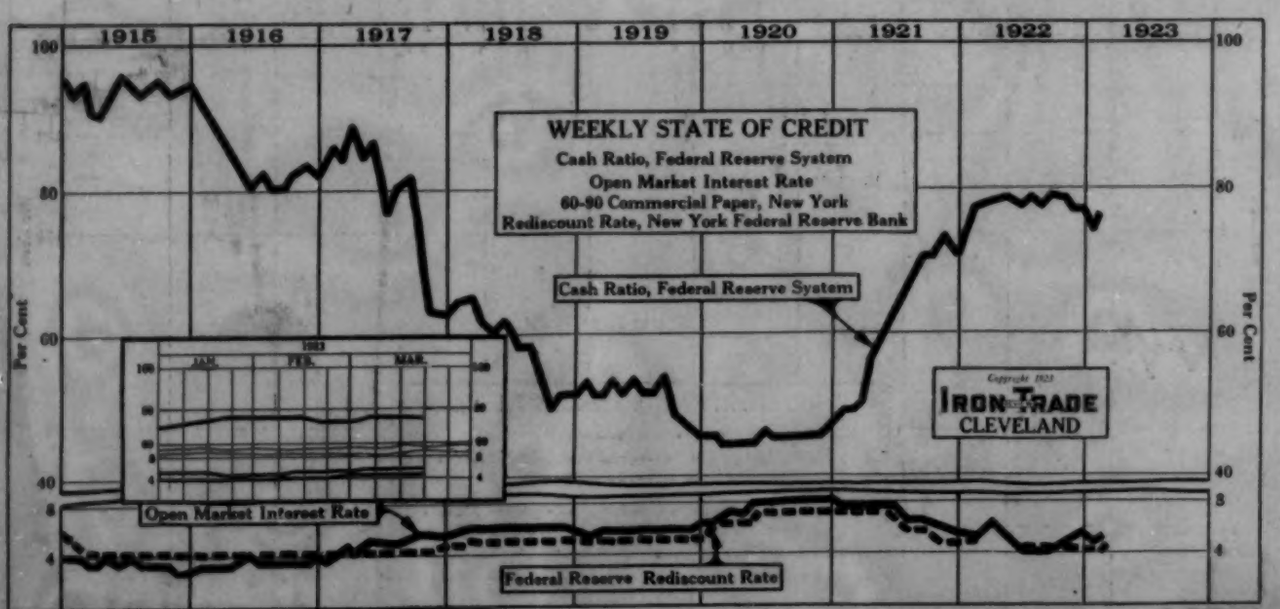
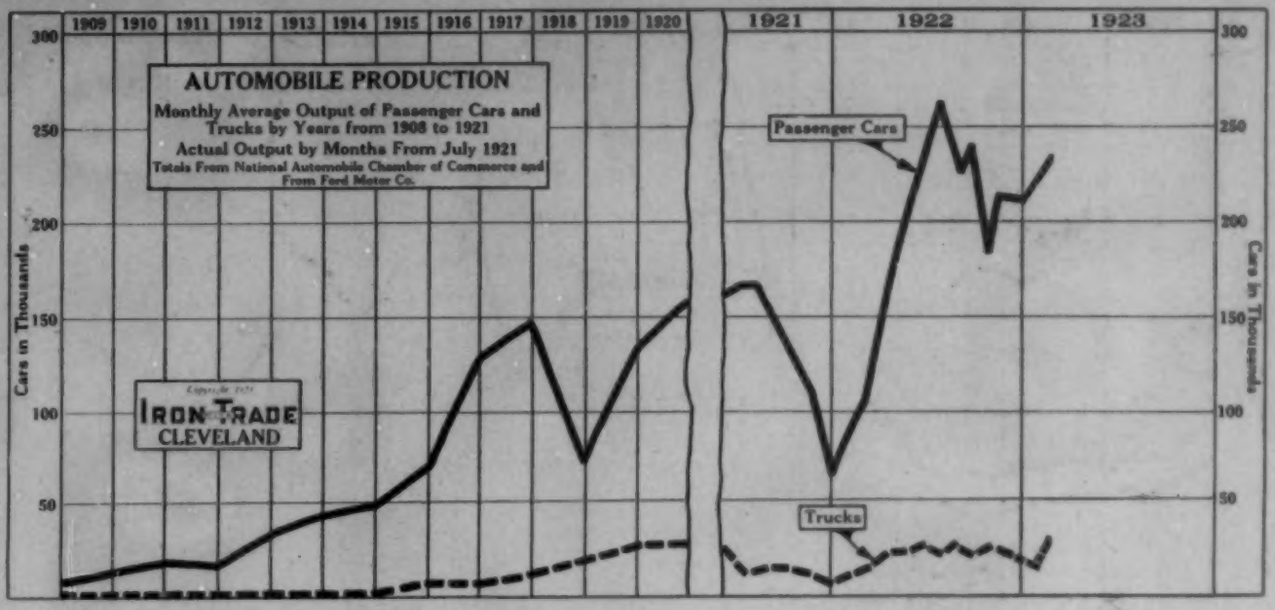
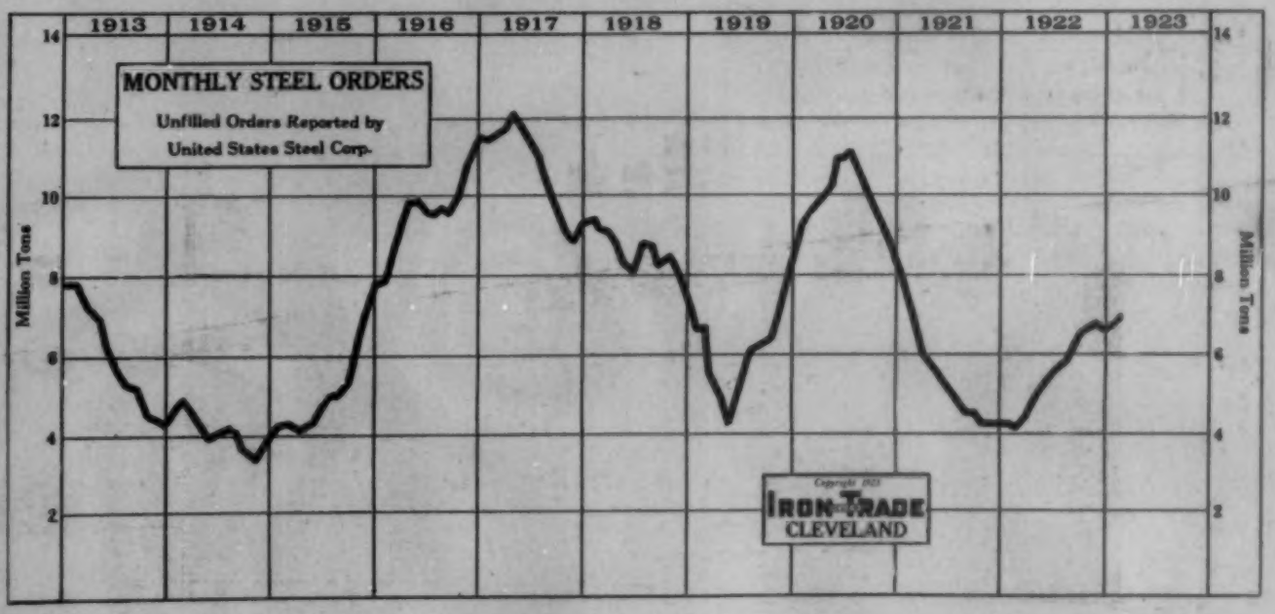
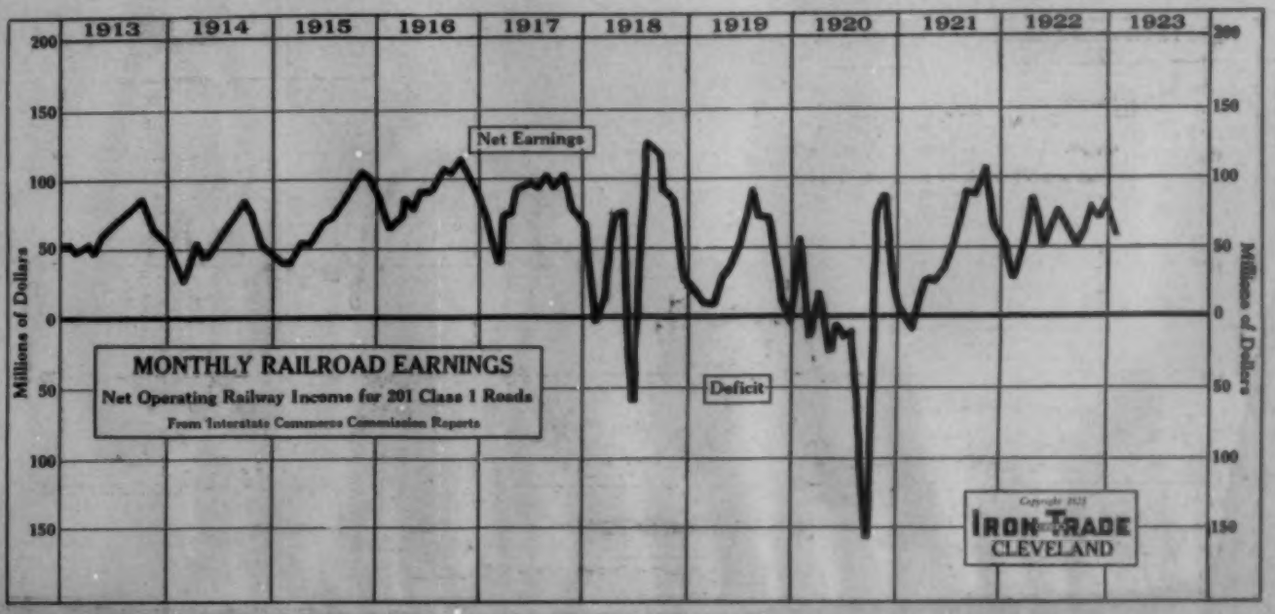
MAR.
IRON TRADE
CLEVELAND

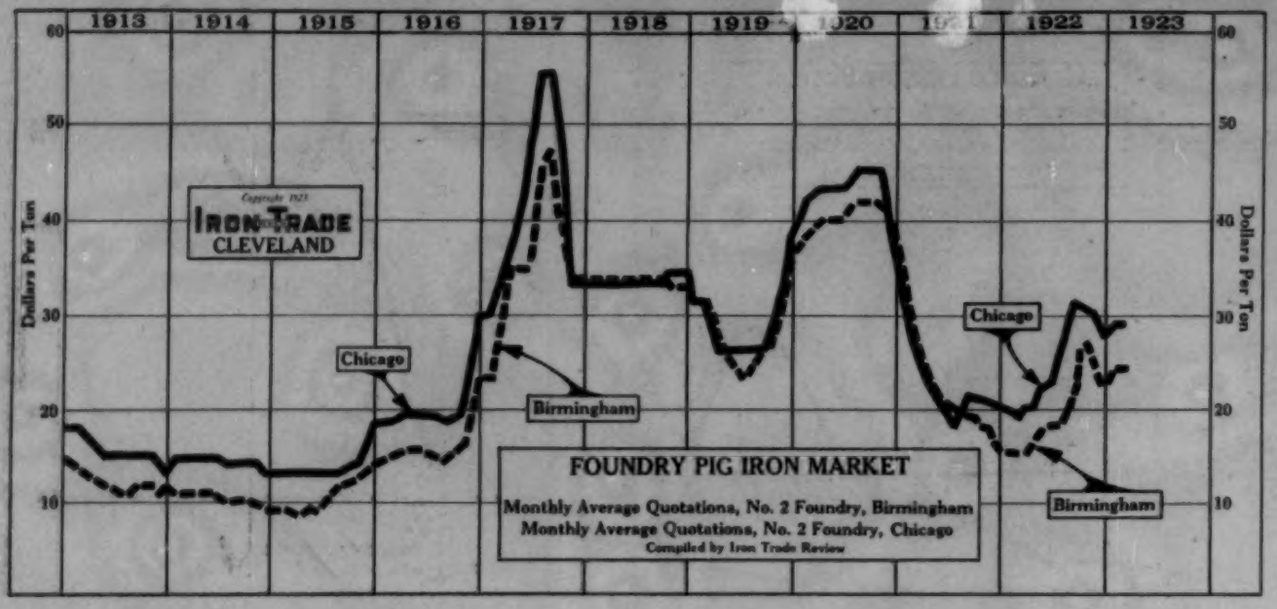

1917
1918
1919
1920
1921
1922
1923
WEEKLY RAILROAD FREIGHT TRAFFIC
Average Carloadings by Weeks
Cars in Thousands
1400
1200
1000
800
600
1923
JAN.
FEB.
MAR.
IRON TRADE
CLEVELAND


1915
1916
1917
1918
1919
1920
1921
1922
1923
WEEKLY STATE OF CREDIT
Cash Ratio, Federal Reserve System
Open Market Interest Rate
60-90 Commercial Paper, New York
Rediscount Rate, New York Federal Reserve Bank
Cash Ratio, Federal Reserve System
Per Cent
100
80
60
40
8
4
1923
JAN.
FEB.
MAR.
Open Market Interest Rate
Federal Reserve Rediscount Rate
IRON TRADE
CLEVELAND


AUTOMOBILE PRODUCTION
Monthly Average Output of Passenger Cars and Trucks by Years from 1908 to 1921
Actual Output by Months From July 1921
Totals From National Automobile Chamber of Commerce and From Ford Motor Co.
Passenger Cars
Trucks
Cars in Thousands
1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
300 250 200 150 100 50
IRON TRADE CLEVELAND


MONTHLY STEEL ORDERS
Unfilled Orders Reported by United States Steel Corp.
Million Tons
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
14 12 10 8 6 4 2
IRON TRADE CLEVELAND


MONTHLY RAILROAD EARNINGS
Net Operating Railway Income for 201 Class 1 Roads
From Interstate Commerce Commission Reports
Net Earnings
Deficit
Millions of Dollars
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
200 150 100 50 0 50 100 150
IRON TRADE CLEVELAND


1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
Dollars Per Ton
60
50
40
30
20
10
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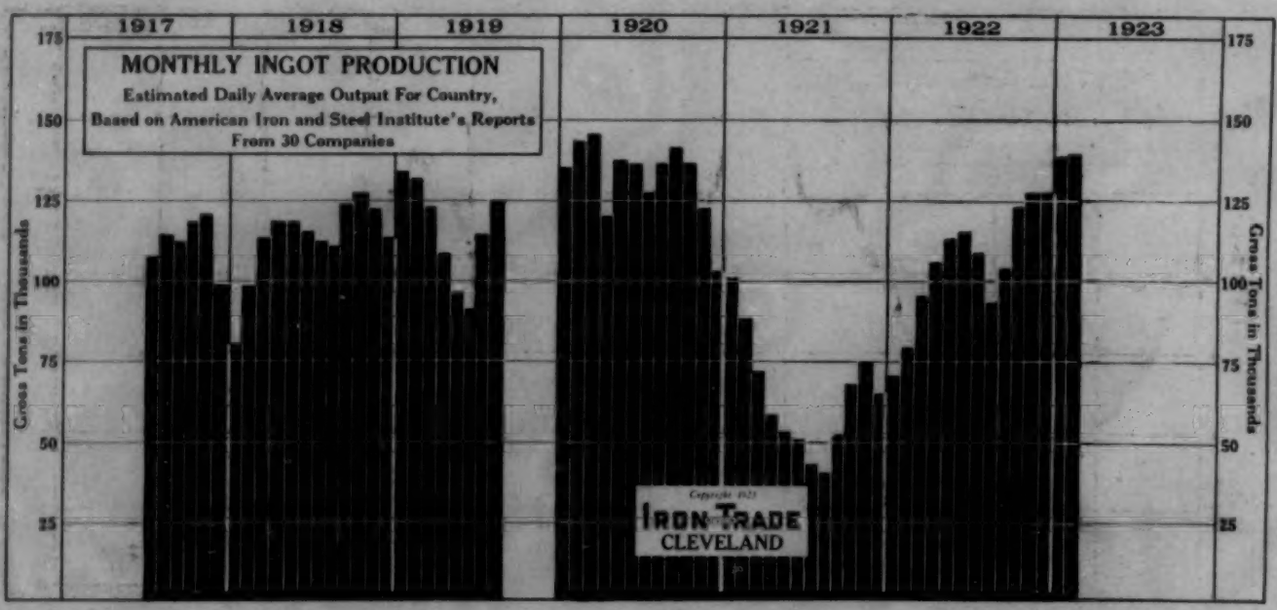
IRON TRADE
CLEVELAND
Chicago
Birmingham
Chicago
Birmingham
FOUNDRY PIG IRON MARKET
Monthly Average Quotations, No. 2 Foundry, Birmingham
Monthly Average Quotations, No. 2 Foundry, Chicago
Compiled by Iron Trade Review


1917
1918
1919
1920
1921
1922
1923
Gross Tons in Thousands
175
150
125
100
75
50
25
MONTHLY INGOT PRODUCTION
Estimated Daily Average Output For Country,
Based on American Iron and Steel Institute's Reports
From 30 Companies
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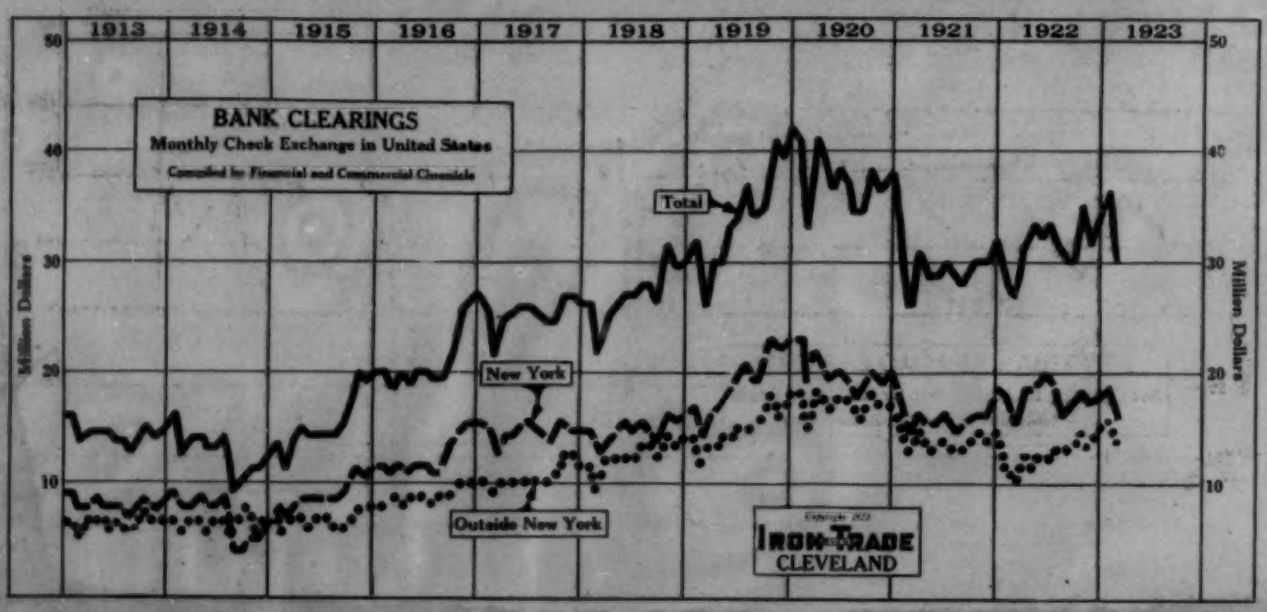

1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
Million Dollars
50
40
30
20
10
BANK CLEARINGS
Monthly Check Exchange in United States
Compiled by Financial and Commercial Chronicle
Total
New York
Outside New York
Copyright 1923
IRON TRADE
CLEVELAND

How Britons Ship Pig Iron to U. S.

American Business Now a Large Factor—Seaside Blast Furnaces Eliminate Railroad Freight Charges—Ports of Middlesbrough, Barrow and Glasgow Especially Equipped for Heavy Iron and Steel Traffic

BY JOSEPH HORTON

ONE of the pleasant surprises in the past year for British pig iron manufacturers was the reappearance of the United States as a buyer on a large scale. The statistics of British foreign trade in 1922 show that the sales to America, including Canada, were a long way ahead of those to any other foreign country.

Of the total exports of pig iron last year amounting to 793,916 tons, the United States took 378,318 tons. The total is the more remarkable when it is remembered that until May practically no iron was shipped across the North Atlantic. The peak was reached in October and although there have since been fluctuations, it seems likely that the purchases by America will constitute an important proportion of the export pig iron business of the United Kingdom at least during the first six months of the present year.

The handling and shipping arrangements which have facilitated this business are naturally of interest to American buyers of pig iron and a few of these facilities will be described in this article. The shipments have for the most part been from the three ports of Middlesbrough, Barrow-in-Furness, and Glasgow, Middlesbrough taking the lead with a total of 136,000 tons dispatched to America. All these centers are favorably situated for the economical handling of foreign business owing to the fact that the blast furnaces are either situated on the coast or on rivers immediately communicating with the open sea. Barrow is practically on the Atlantic seaboard while Middlesbrough with its works on either side of the Tees, and Glasgow able to ship direct into the Clyde are about equally favorable in regard to their qualification for efficiently handling foreign business.

Pig Iron Imports Heavy

DURING the last few months of 1922 the pig iron imports into the United States reached the largest total ever recorded in any comparable period since 1913. The bulk of the imported pig iron was brought from England. The accompanying article by the British correspondent of IRON TRADE REVIEW *explains the method and procedure of shipping English pig iron to the United States.*

Most readers of IRON TRADE REVIEW are familiar with the general location of Middlesbrough on the banks of the river Tees, and it will be necessary in regard to this port to give only a few details of the loading arrangements, some of which have been furnished by the Cleveland Ironmasters' association, and Bell Bros. Ltd., the principal manufacturers of pig iron for the syndicate of Dorman Long & Co., one of the largest of the Middlesbrough shippers. The Clarence works of Bell Bros. Ltd., is situated on the north bank of the Tees in the county of Durham, and consists of 11 blast furnaces, coke oven plant and the necessary apparatus for dealing with by-products as well as acid and sintering plants, engineering shops and docks. The works is self-contained for the manufacture of pig iron. In normal times the number of furnaces making pig iron from Cleveland and Spanish iron ore is eight and the output 7000 tons per week. At present two blast furnaces with a weekly output of 3500 tons are operating largely for American requirements and producing special iron.

Each furnace is tapped every four hours yielding 50 tons, that portion of the output which is merchant iron being cast in sand in combs comprising 32 pigs attached to the sow or runner and weighing complete 2.2 to 2.5 tons. When cold the combs are lifted by means of electric magnets attached to 5-ton overhead cranes, of which there are two running the full length of the front of the furnaces and extending to a storage bay where the iron is stocked in the

AT GLASGOW DOCKS THE PIG IRON IS TRANSFERRED FROM RAILROAD CARS TO THE SHIP'S HOLD BY A MAGNET CRANE

ONE OF THE DOCKS AT BARROW-IN-FURNESS SHOWING LARGE LOADING CRANE

NORTHEASTERN RAILWAY CO. DOCK AT MIDDLESBROUGH SHOWING CRANES USED FOR LOADING PIG IRON

THE COMBS ARE TRANSFERRED TO THE BREAKER AND WEIGHING MACHINE IN 20-TON LOTS ON FLAT CARS

comb form. From the pig beds the combs are placed in 20-ton lots on suitable flat cars, standing on a siding arranged under the crane. They are conveyed by locomotives to the weighing machine, each carload being carefully weighed and then returned to the storage yard where it is graded and put into different stacks in the comb form, or passed through a metal breaker of the Lowca type within reach of the cranes, the breaker having a capacity of 50 tons per hour. Leaving the breaker the divided pig iron falls from the machine into low-sided cars and is weighed again. Thence it is taken to the wharf for loading into vessels each car containing 20 tons of broken or half-broken iron. The iron is conveyed by the electric cranes from the cars to the ship in trays and the men in the hold of the ship distribute the cargo to suit the accommodation.

For the accommodation of steamships, this company has a wooden wharf 1100 feet long with four 6-ton electric cranes and two steam cranes and a reinforced concrete wharf 800 feet long equipped with four 6-ton electric cranes having long jibs. Large ships can be accommodated and recently a ship of 10,500 tons capacity was loaded with 8000 tons of pig iron. Details of these facilities in the port of Middlesbrough, are shown in some of the accompanying illustrations.

A few general particulars of the Tees dock and railway arrangements may be added. The Middlesbrough dock is on the south bank of the Tees about eight miles from the mouth of the river. This dock is equipped with about 50 hydraulic and steam cranes with lifting capacities ranging from 1½ to 30 tons. The height of jib of the electric cranes from the quay level is 60 feet, the jib radius 44¾ feet and the revolving speed at the hook is 400 feet per minute. The dock entrance, quays, store yards, sidings, etc., are provided with electric light and there are considerably over 20 miles of dock railway. The North Eastern railway communicates with all the iron and steel works, and where rail transit is necessary the work can be carried out expeditiously.

Low-Phosphorus Barrow Irons

The call for special foundry irons from America has naturally given Barrow-in-Furness a good share of this business owing to the characteristics of the West Coast brands. The share of the Barrow Hematite Co., amounted to about 10,000 tons in the last three months and inquiries are still abundant. This company has been producing a special iron of low phosphorus and sulphur content guaranteed at a maximum of 0.03 per cent each. It is understood that the American buyers are insisting on a very low copper content which in this instance has been kept down to 0.015 per cent. The West Coast ores are the richest in the kingdom, the iron content being 50 per cent and upward. Although a certain proportion of foreign ore is employed the basis of the manufacture is the local ore within easy reach of the furnaces. The American business is a revival of pre-war transactions but previous shipments have never reached anything like the present tonnages.

Most of this pig iron is shipped over the Barrow docks which link up with the Furness railway. The lines of railway intersect the works in every direction and communicate with the three principal docks, namely the Devonshire, Buccleuch and Ramsden docks, the largest distance from the works to the point of shipment not exceeding half a mile.

The three docks comprise a water space of 131½ acres and each dock has two entrances with tidal basins.

The Ramsden dock has a depth of 32 feet of water and an area of 60 acres. There is a fairway or channel dredged to a depth of 28 feet 3 inches through the Ramsden, Buccleuch and Devonshire docks to the 150-ton crane on the last named. On the west side of Ramsden dock is the Anchor Line basin where the quays are long enough to accommodate eight large steamers.

The Barrow docks are well equipped for dealing with any quantity of pig iron, and during the past nine or ten months practically 50,000 tons of metal has been shipped from this port. Vessels of 6000 to 7000 tons capacity are easily handled and a cargo of 5000 tons can be loaded and stowed in five days. The following table shows the average rate of loading of some recent cargoes of pig iron per hour, per crane, this iron having been shipped by the Barrow Hematite Co., Barrow-in-Furness:

Steamship	Dumped Tons	Stowed Tons
Barrymore	39.30	....
Appomattox	32.38	31.02
Novian	29.24	26.95
Lord Antrim	35.10	29.09
Parisiana	34.86	30.50
Appomattox	45.97	28.47
Ramore Head	40.79	24.61
Nevisian	34.09	29.50
Lord Downshire	40.94	30.19

There are several types of cranes operated at the docks all worked by hydraulic power supplied from nearby generating station. For small vessels up to 2500 tons, 1½-ton hydraulic cranes are used which work at good speeds and thereby facilitate quick dispatch. For large vessels two heavier cranes having a large radius have lately been installed. Three sets of railway tracks extend the full length of the loading berths alongside and loading is done by means of a tray slung from four corners, the pigs being placed on the tray by laborers working in the cars. When full the tray is lifted overside and lowered upon a staging running across the ship's hold. On either side of the skip are fixed angle bars, while on the staging itself is fixed a tripping rail. The effect of this is to dump the pig iron from the skip into the hold as soon as it reaches the staging. The accompanying diagram shows the construction of the loading tracks.

Adjacent to the docks are large storage areas. Their chief use is for the stocking of the thousands of tons of ore which are dumped every year, the ore being kept in stock for use at the local furnaces as needed. These areas could be equally well utilized for stacking pig iron or steel and the necessary arrangements could be made for loading direct from the stocking area into the ship.

Barrow-in-Furness faces Morecambe bay, an inlet from the Irish sea which in turn gives direct approach to the Atlantic. The water areas are spacious and allow adequate facilities for shipping. Movable bridges which give access to the various docks for the handling

of the largest ships also are to be noted. Walney island facing Barrow and separated by Walney channel is rapidly becoming a residential area for the employes of Vickers Ltd., this shipbuilding firm having big yards and docks covering a large area of Barrow itself.

Next in importance to Middlesbrough and Barrow is the port of Glasgow from which good sized tonnages of pig iron are shipped to America. The Scotch product appears to suit the American buyer's requirements and this material promises to be called for in larger quantities.

Most of this pig iron is shipped over municipal docks controlled by the port of Glasgow. Recently magnets have been attached to the 4-ton cranes which previously were operated with slings or baskets. It is not the practice at Glasgow to stock material on the quays. The iron is brought direct from the blast furnaces to the quay alongside the ship in railway cars from which the material is transferred to the hold of the vessel. It has not been found necessary at Glasgow to localize the pig iron loading to any particular wharf, all the berths being equipped with suitable crane power and able therefore to handle the material efficiently.

The large business done during the past year has been carried through in spite of heavy railway rates which range from 60 to 90 per cent above the prewar level, and it is a particular grievance of the works located near the coast that the continuation of the flat rate surcharge operates adversely to those using the railways for short distances. This has been referred to repeatedly in the Middlesbrough area where some of the blast furnaces, although favorably located, are not able to dispense altogether with railway service. It is hoped that under the new scheme of railway amalgamations which are calculated to effect various economies some concessions will be made that will further assist the expansion of the pig iron export business and so enlarge a branch of trade which during the past year has been of so much value in helping forward the recovery of the British iron and steel trade.

While a certain amount of iron is shipped to America from Midland areas such as Derbyshire, it is obvious that this business gravitates naturally to the furnaces on the coast where the proximity to the seaboard may effect a saving of anything from 10s to 15s ($2.35 to $3.55) per ton in railway rates, although at Barrow the shippers have to meet certain railway expenditures and port charges. These are avoided by such firms as Bell Bros., of Middlesbrough, who are able to discharge the pig iron into the hold of the seagoing vessel without depending upon any sort of cooperation from the railway companies.

Following is a list of the principal

THE FIRST STEP IN EXPORTING SAND CAST PIG IRON IS TO PICK THE COMB OUT OF THE SAND BED WITH A MAGNET CRANE

shippers that have been active in the recent trade in British pig iron with the United States:

William Baird & Co., Ltd., 168, W. George Street, Glasgow.

Shotts Iron Co., Ltd., 1 Castle Street, Edinburgh. (Branch—141, W. George St., Glasgow.)

Pease & Partners, Ltd., Tees Ironworks, Cargo Fleet, Middlesbrough, and Tees Bridge Ironworks, Stockton-on-Tees. (Head Offices: 92, Northgate, Darlington).

D. Colville & Sons, Ltd., 195, W. George Street, Glasgow.

Summerlee Iron & Coal Company, Ltd., 176, W. George Street, Glasgow.

Merry & Cuninghame, Ltd., 127, St. Vincent Street, Glasgow.

James Dunlop & Co., Ltd., 7, Royal Bank Place, Glasgow.

Bolckow, Vaughan & Co., Ltd., Middlesbrough.

Bell Bros., Ltd., Zetland Road, Middlesbrough.

Sir B. Samuelson & Co., Ltd., Middlesbrough.

Cargo Fleet Iron Co., Ltd., Middlesbrough.

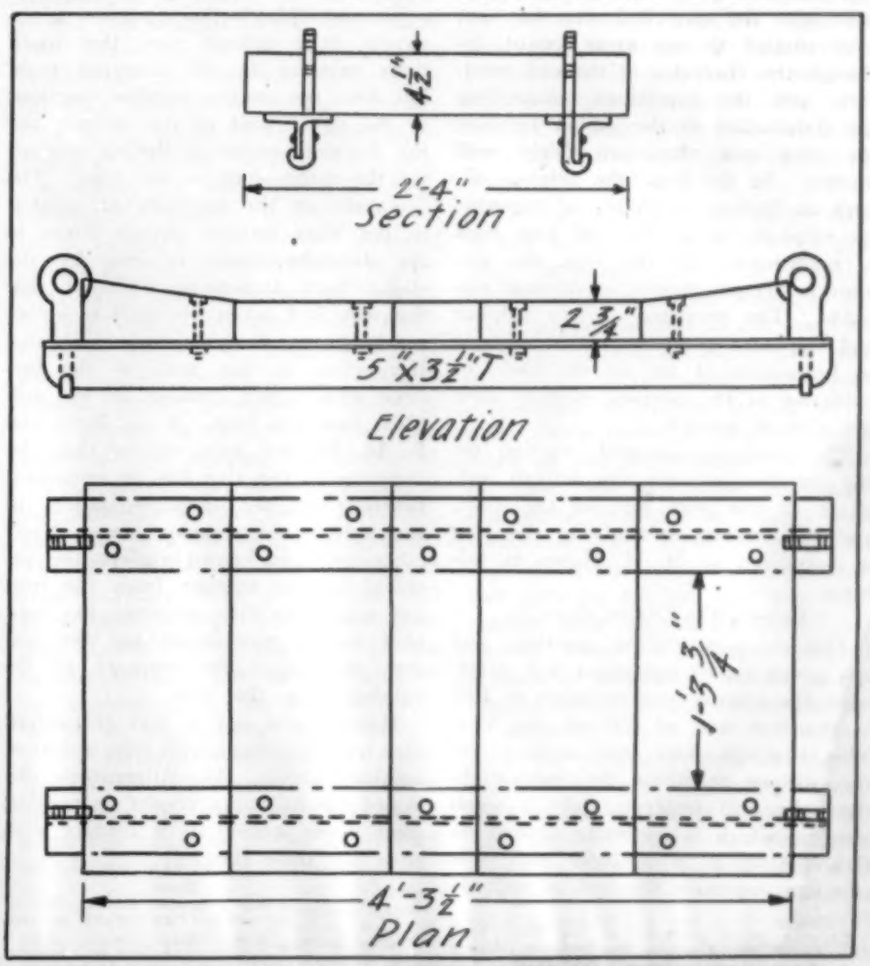
Dorman, Long & Co., Ltd, Zetland Road, Middlesbrough.

Carlton Iron Co., Ltd., Carlton Ironworks, Ferryhill (Proprietors of colliery. Dorman, Long & Co.)

Barrow Hematite Steel Co., Ltd., Barrow-in-Furness, Lancashire.

Millom & Askam Hematite Iron Co., Ltd., Millom, Cumberland, and Askam Ironworks, Askam, Lancashire.

North Lonsdale Iron & Steel Company, Ltd., Ulverston, Lancashire.



LOADING BOARD FOR PIG IRON USED AT BARROW-IN-FURNESS BY THE BARROW HEMATITE CO.

Restricting Sulphur in Pig Iron

Study Reactions of Sulphur in Coke During Smelting Process—Believe Constituents Contained in Coke Enter Iron in Upper Region of Furnace—Outline Methods for Further Investigation on This Subject

BY ALFRED R. POWELL

SULPHUR has been one of the most troublesome elements encountered since the earliest days of iron smelting, and this problem will become of increasing importance as the higher sulphur coke is used, because of the rapidly diminishing supply of low sulphur coals suitable for the manufacture of metallurgical coke.

The deleterious effect of sulphur in iron and steel is well known. Therefore, except in special cases, it is desirable to make the iron produced by the blast furnace as low in sulphur as possible. Sulphur enters the furnace in all of the raw materials, but principally in the coke. It comes out of the blast furnace distributed between the iron and slag. Little passes out of the furnace with the gases.

The mechanism of the reactions that cause the sulphur of the coke to pass into the slag and iron has not been studied to any great extent, although the character of the end products, and the conditions controlling the distribution of the suphur between the iron and slag, are fairly well known. In the iron, the sulphur occurs as ferrous sulphide; or manganese sulphide in the case of iron high in manganese. In the slag, the sulphur is present mostly as calcium sulphide. The presence of free sulphur and sulphates in blast furnace slags is to be accounted for on the basis of oxidation of the calcium sulphide after the slag is tapped.

The generally accepted reaction for the relation between the ferrous sulphide in the iron and in the coke, and the calcium sulphide in the slag is that given by H. M. Howe, as follows:

$$FeS+CaO+CFe+CaS+CO$$

This is a reversible reaction, and any given set of conditions will determine the relative concentration of FeS in the iron and of CaS in the slag. This reaction does not account for the various reactions the sulphur in the coke will undergo, only a small part of which is normally present as FeS. Also, it is unlikely that this equation expresses the real compounds entering into the reaction, for this system represents four phases, namely, two liquid, one solid and one gaseous.

In such a complex system, the true relationship should be expressed by a series of equations. Thus the carbon would be in equilibrium with carbon monoxide in the gaseous phase; the carbon monoxide would be in equilibrium with the CaO in the slag; and this, in turn would be in equilibrium with the complex silicates of the slag. The CO and CaO would have a tendency to form metallic calcium, which would form CaS with the sulphur; and the dissociation pressure of this CaS would balance the dissociation pressure of FeS in the iron, through the medium of a low but definite partial pressure of free sulphur in the gaseous phase.

Equation Covers Slagging Condition

The desulphurization equation given covers, in a general way, the conditions existing in the slagging zone, but does not explain sulphur reactions in the upper part of the furnace nor the reaction occurring during and after the combustion of the coke. The literature on the reactions of sulphur in the blast furnace always refers to the desulphurization of iron by the slag. Such statements intimate that the iron had taken up sulphur before reaching the slagging zone, and that the action in this zone of the furnace was a part removal of the sulphur from the iron. A. L. Feild and P. H. Royster have shown that the viscosity of the slag has an important bearing on the desulphurization of the iron in the slagging zone. Many other factors are known to affect the removal of the sulphur from the iron but apparently little attention has been paid to the mechanism and the factors that affect the entrance of the sulphur into the iron.

Many years ago it was recognized that iron in contact with coke absorbed sulphur readily. G. Hilgenstock obtained the following results on melting steel when leaving it in contact with coke for some time:

	Silicon per cent	Manganese per cent	Carbon per cent	Sulphur per cent
Original metal..	0.38	0.45	0.62	0.04
After fusion.....	0.58	0.18	1.89	0.50

This shows that large quantities of sulphur may be absorbed when the iron and coke are in contact.

Experiments were conducted by F. Wuest and P. Wolff to determine what action the ascending blast furnace gases have on the sulphur in the coke before the coke reaches the combustion zone. Although this investigation was carried out on a laboratory scale, it indicated certain tendencies in the upper part of the blast furnace. It was found that carbon monoxide removed a fairly large part of the sulphur at 1000 degrees Cent., and that the other constituents of the blast furnace gas removed sulphur from the coke in varying proportions. In order to show how the sulphur removed from the coke acted on the iron ore and limestone of the charge, a mixture corresponding to blast furnace gas was passed over pulverized coke held at 1000 degrees Cent., and then over iron ore or limestone held at a high temperature.

From their experiments, Wuest and Wolff conclude that the sulphur of the coke does not reach the level of the tuyeres of the blast furnace without undergoing alteration; but a great portion of it is volatilized by the ascending gases and then is absorbed largely from the gases by the descending charge, in which condition it arrives in front of the tuyeres. They concluded that, up to 800 degrees Cent., the sulphur is absorbed principally by the oxides of iron from the sulphur-laden gases; while from 800 degrees upwards, the lime becomes the chief absorbent of the sulphur.

O. Simmersbach disagrees with these investigators. He points out that the experiments were performed with pulverized coke, thereby giving a large surface exposure, whereas the lump coke used in the blast furnace presents an entirely different problem. He quotes several cases where analyses have been made of the coke blown out of the tap hole of the furnace. He found in such a coke an average sulphur content of about 75 per cent of the total sulphur. An investigation by M. Boecker shows that a coke with an average sulphur content of 0.77 per cent showed 0.50 per cent in the coke blown out of the tap hole, and in the center of the lump coke, 0.59

From a paper presented at the New York meeting of the American Institute of Mining and Metallurgical Engineers, Feb. 19-21. The author is associate chemist, Pittsburgh experiment station, United States bureau of mines.

per cent. In these cases the coke had been exposed to combustion conditions for a short period, so that all of the loss in the sulphur could not be ascribed to the furnace gases.

As will be shown later, Wuest and Wolff were probably correct in stating that a transference of sulphur from the coke to the iron and lime took place in the upper regions of the furnace; but they were incorrect in assuming that this transference was almost complete by the time the tuyeres were reached. However, if only about 5 per cent of the sulphur in the coke found its way into the iron, this would represent the average sulphur tolerance in the finished iron; any percentage above this would have to be decreased in the slagging zone of the furnace. For this reason, even a slight desulphurization of the coke in the upper portion of the furnace is important from the standpoint of blast-furnace reactions.

Forms of Sulphur in Coke

In the general investigation that the bureau of mines has carried on for the past few years on the sulphur in coal and the reactions that the various sulphur forms in coal undergo during the coking process, it was realized that many metallurgical operations were affected by the sulphur present in coke. The manner in which the sulphur was combined in the coke had never been determined, though it was known that a portion was in the form of ferrous sulphide and that minute quantities of calcium and magnesium sulphides might be present. It was also known that small quantities might be in the form of metallic sulphates, resulting probably from oxidation of the sulphides during the cooling of the coke. But the major portion of the sulphur in the coke, often 90 per cent of the total sulphur, was referred to generally under the designation of organic sulphur.

It was impossible to use the ordinary methods of chemical examination to determine the nature of this organic sulphur. Distillation and solvents were out of the question, because the coke sulphur did not respond to either treatment. The method adopted depended on the use of the phase rule. Keeping the temperature constant, the relations between the concentrations of sulphur in the coke and the pressures of free sulphur over the coke were determined. The extremely small pressures, of free sulphur vapor were determined by an indirect method, which is beyond the scope of this paper to describe.

These experiments showed that before the coke was removed from the oven, and while still in a reducing atmosphere, the sulphur occurred in the coke in two characteristic forms; namely, the major portion as sulphur closely associated with the carbon, probably as a solid solution of sulphur in carbon, the remainder as ferrous sulphide, with a very small quantity of calcium or magnesium sulphide. But when the coke is quenched, oxidation of these metallic sulphides takes place, so that the final cold coke has lost perhaps half of its ferrous sulphide content, the oxidation products being mainly free sulphur, which is retained by the coke as absorbed free sulphur, and a small quantity of sulphate. This oxidation of the ferrous sulphide takes place with great rapidity over a certain temperature range, and despite the rapid cooling of the coke when quenched, air enters the pores of the coke in sufficient quantity to produce appreciable oxidation effects. If the coke is cooled in a strictly reducing atmosphere, only metallic sulphides, and the solution of sulphur in the carbon are found in the cold coke. Furthermore, if coke subjected to oxidation, as is the case with all commercial cokes, is reheated in a reducing atmosphere, reversion of the sulphur to the two original forms takes place. This latter fact is of importance in considering the sulphur reactions in the blast furnace, for in that case we have a reheating of the coke in a strongly reducing atmosphere.

Summing up, then, hot coke in a reducing atmosphere or coke cooled in a reducing atmosphere contains sulphur dissolved in carbon, in the form of a solid solution, and ferrous sulphide, with perhaps small quantities of calcium or magnesium sulphides. Coke cooled in the ordinary manner in the presence of air contains sulphur in these two forms, also adsorbed free sulphur, and sulphates.

To illustrate these sulphur forms we may consider a coke made from Illinois coal in a standard type of oven. The distribution of sulphur in this coke is typical of a great many that have been studied, and gives some idea of the relative quantities of the various forms. The first column of the analysis gives the sulphur distribution in the original coke, just as it was received from the plant, while the second column gives the sulphur distribution in the same coke after a portion has been heated and cooled in an atmosphere of hydrogen.

	Original coke, per cent	Coke after reduction, per cent
Solution of sulphur in carbon	0.84	0.84
Ferrous sulphide	0.26	0.47
Adsorbed free sulphur	0.19	0.00
Sulphates	0.02	0.00
Total sulphur in coke	1.31	1.31

At present, this topic must be discussed largely from theoretical considerations, because no actual study has been made of the coke, iron, and slag from different zones of the blast furnace. In passing down the furnace, the coke goes through the reduction, the iron sponge, the preliminary slag formation, and the combustion zones.

Reducing Zone Converts Sulphur

In the reducing zone the gases are reducing, and the temperature varies from below a red heat to 800 degrees Cent., so the adsorbed free sulphur present in the original coke will be reconverted into ferrous sulphide. This reduction of the free sulphur is important, for the adsorbed sulphur gives a higher partial pressure of free sulphur in the vapor phase than ferrous sulphide. The experiments previously described showed that ferrous sulphide produced a partial pressure of about 10^{-8} atmospheres of free sulphur in the vapor phase at 800 degrees Cent., while adsorbed free sulphur at the same temperature gave much higher pressures. As the partial pressure of free sulphur vapor over the coke measures the tendency of the sulphur to pass out of the coke, this reduction causes the coke to retain its sulphur much more tenaceously than it would if no reduction occurred.

The sulphates are a minor factor in the sulphur of the coke, but probably there is, at least, a partial reduction of them in the reduction zone However, the change is not important, for the sulphates are stable and would be retained in the coke. The solution of sulphur in carbon is one of the most stable forms of sulphur encountered in the investigation of sulphur in coke. At any given temperature, the partial pressure of sulphur vapor from this form is much lower than that of ferrous sulphide. Furthermore, this form of sulphur does not change readily into any other form. Reduction does not change this solid solution of sulphur in carbon, and oxidation affects it only when the coke is oxidized.

In the reduction zone of the furnace, the removal of sulphur from the coke would be almost negligible. The free sulphur would be quickly reduced to ferrous sulphide and would have no chance to be volatilized and then absorbed by the iron oxides. The partial pressure of sulphur vapor from ferrous sulphide would be small at

800 degrees, consequently, little sulphur could be transferred from the coke to the oxides of iron from this source, and any removal of the solid solution form of sulphur from the coke is out of the question.

Summing up, then, it may be said that the only sulphur reaction of any importance in the reduction zone is the reduction of the absorbed free sulphur of the coke to ferrous sulphide. The coke reaches the bottom of the reduction zone with practically no loss of sulphur.

There is comparative inactivity in the iron sponge zone, as far as the general blast furnace reactions are concerned. The limestone loses most of its carbon dioxide, and spongy iron loses the traces of FeO that may remain, and the coke, in general, remains unchanged. However, this zone probably is important from the standpoint of the sulphur reactions. The sulphur of the coke remains in the solid solutions and ferrous sulphide forms that resulted from the reactions in the reduction zone. The former, being stable, remains unchanged and has no tendency to pass out of the coke; the ferrous sulphide is subjected to constantly increasing temperature, and the partial pressure of free sulphur vapor increases at a rapid rate. From the work on the sulphur in coke, it was found that the partial pressure of sulphur vapor from ferrous sulphide or, more properly, the decomposition pressure of ferrous sulphide, increased about 20 times for every 100 degrees Cent. rise in temperature. In other words, at 900 degrees Cent., the decomposition pressure is 20 times that at 800 degrees Cent., at 1000 degrees, 400 times as much; at 1100 degrees, 8000 times as much, and so on.

In Contact With Iron

The sulphur from the ferrous sulphide constituent of the coke will have an increasing tendency to pass out of the coke as the higher temperatures of the furnace are reached, as this desulphurization of the coke will be assisted by the upgoing gases. However, this evolved sulphur will not remain long in the gaseous phase, for it will come into contact with two active absorbents in the form of the hot spongy iron and the lime. At first it might appear strange that the iron would absorb the sulphur to form ferrous sulphide, while at the same time the ferrous sulphide of the coke was decomposing; in other words, it might appear that the ferrous sulphide in the coke and that in the iron were in equilibrium and there would be no transfer of sulphur from one to the other. But the ferrous sulphide of the coke exists in a distinctive solid phase, while the ferrous sulphide formed in the iron occurs as a solid solution with the iron and is subject to the laws governing solutions. The dissociation pressure of the ferrous sulphide in the coke is, therefore, the true dissociation pressure of ferrous sulphide; while that in solution in the iron has a dissociation pressure which is only a small fraction of the true value. Equilibrium conditions, therefore, call for a transfer of the sulphur from the ferrous sulphide of the coke to the iron until the iron iron-sulphide solution phase of both the coke and the iron have the same percentage composition. If this equilibrium point were reached, practically all of the ferrous sulphide sulphur from the coke would be transferred to the iron. This condition is never realized, for the complete decomposition of the ferrous sulphide of the coke could not be affected in the short time the charge remains in this zone.

Results of Tests

Another factor that complicates the reactions in this zone is the formation of lime. Lime absorbs sulphur readily under high temperature reducing conditions to form calcium sulphide. Tests have shown that calcium sulphide has a decomposition pressure much lower than that of ferrous sulphide at any given temperature, and of about the same order as the low pressure exerted by the solid solution form of sulphur. Therefore, in this zone, the iron and the lime will compete for the sulphur evolved. If equilibrium between the various constituents of the furnace charge were attained, we should find that the coke had lost practically all of its ferrous sulphide, and that the sulphur would be distributed between the lime and the iron in such proportions that the decomposition pressure of the ferrous sulphide in the iron would exactly equal the decomposition pressure of calcium sulphide. This relationship has not been determined, and is probably not of much practical importance, for it is improbable that equilibrium is attained. The main determining factor in the distribution of the sulphur between the iron and the lime is the relative intimacy of contact between these materials and the coke. As it is probable that both the spongy iron and the lime are in fairly intimate contact with the lumps of coke, there is not likely to be any preferential absorption of sulphur by either material, and sulphur will enter both the iron and the lime.

In this zone, the absorption of sulphur by the iron may be considerable, as shown by some laboratory experiments, in which the iron used consisted of short length of iron baling wire. A definite weight of this iron was buried in a small quantity of granular coke contained in a crucible and the crucible was covered, so that there would be no free access of air, and then heated to a bright red heat in a muffle furnace. Under these conditions the atmosphere would quickly become reducing because of the formation of carbon monoxide and a smaller quantity of carbon dioxide. After cooling, the iron was removed and analyzed for sulphur.

The first coke used contained over 3 per cent of total sulphur. One batch of this coke was previously oxidized at about 500 degrees Cent.; it has been found that this treatment completely oxidizes the ferrous sulphide, so that the coke contains only solid solution sulphur and adsorbed free sluphur, and a small quantity of sulphate. Another batch was reduced by hydrogen so that it would contain only solid solution sulphur and ferrous sulphide. In this way the relative effect of the adsorbed free sulphur and ferrous sulphide could be studied. It was assumed, later tests showed this assumption to be correct, that the solid solution form would be inert and would have no action on the iron. The results of this test were as follows:

	Oxidized coke, per cent	Reduced coke, per cent
Sulphur content of original iron	0.064	0.064
Sulphur content of iron after exposure to coke.....	0.219	0.215

These results show that a rather large amount of sulphur is taken up by the iron, when in contact with coke, and that the relative amounts of absorbed free sulphur and ferrous sulphide in the coke do not affect the sulphur adsorption. This fact is to be explained on the basis of the reducing atmosphere in the crucible and the consequent reduction of any free sulphur to ferrous sulphide. This confirms the statement that any free sulphur in the coke is quickly changed to ferrous sulphide in the reduction zone of the furnace, and that the sulphur which the iron takes from the coke comes from the ferrous sulphide.

In another set of experiments an effort was made to maintain a slight oxidizing influence in the red hot crucible containing the coke, by leaving the lid off the crucible so that the coke would have free access to

the air. In this case, the Illinois coke mentioned was used. It contained 1.31 per cent of total sulphur and was, therefore, more like an ordinary metallurgical coke than the high sulphur coke just used. To bring out the relative effect of the oxidizing atmosphere, a test in a covered crucible was run parallel with this and the following results were obtained:

	Crucible covered, reducing, per cent	Crucible uncovered, oxidizing, per cent
Sulphur content of original iron	0.064	0.064
Sulphur content of iron after exposure to coke.....	0.241	0.339

These results show that an oxidizing atmosphere tends to throw more sulphur into the iron, which was to be expected, for free sulphur with its comparatively high vapor pressure would be formed. Another fact brought out was the comparative amount of sulphur introduced into the iron by this coke and the higher sulphur coke used in the first experiments. About the same quantity of sulphur was given up to the iron by the lower sulphur coke as by the higher sulphur coke, even under reducing conditions. However, an equal absorption might be expected when it is considered that the pressure of free sulphur vapor over the coke is independent of the amount of sulphur contained in the coke, for ferrous sulphide will exhibit the same dissociation pressure for any given temperature, regardless of the quantity of ferrous sulphide present. The limiting factor that determines how much sulphur will be taken up by the iron in the sponge iron zone is, therefore, not the amount of sulphur in the coke but the speed with which the ferrous sulphide formed at the surface of the iron diffuses into the interior of the iron. In this connection, it must be remembered that the spongy iron of the blast furnace offers a large surface for the absorption of the sulphur to take place.

Sulphur Removed With Acid

The experiments just described offer some explanation of what the absorbed free sulphur and the ferrous sulphide forms of sulphur may be expected to do in the sponge iron zone of the blast furnace. Under the same conditions, the solid solution form of sulphur should be practically inert and contribute no sulphur to the iron. In order to determine this, the Illinois coke was reduced by hydrogen and then treated with boiling hydrochloric acid, to remove from the coke all the sulphur forms except the solid solution of sulphur in carbon. The following result was obtained, the coke and iron being kept under the usual reducing conditions:

	Per cent
Sulphur content of original iron.....	0.064
Sulphur content of iron after exposure to coke	0.083

A comparison of this result with the results obtained from the coke in which the ferrous sulphide was present shows a great difference in the amount of sulphur absorbed. In fact, it is doubtful whether the small amount of sulphur taken up from the coke came from the solid solution form. It is more probable that this came from a small amount of ferrous sulphide left in the coke after the acid treatment.

As lime is present in this zone, in addition to the spongy iron and the coke, tests were run in which lime was mixed with coke in which the iron was buried. Under these conditions, the lime would be in more intimate contact with the coke than the iron. The results from several tests showed that practically no sulphur was taken up by the iron, all of the sulphur given off by the coke being absorbed by the lime. However, the relative intimacy of contact between the lime and the coke was greater than in the blast furnace, so it must not be assumed that the lime in the spongy iron zone will protect the iron from contamination by sulphur. The following are the results from tests performed with Illinois coke, the same coke as used before, where the coke and iron were held at almost white heat for some time:

	Original coke per cent	Coke + CaO, per cent	Coke + MgO, per cent	Coke + Na_2CO_3 per cent
Sulphur content of original iron..	0.064	0.064	0.064	0.064
Sulphur content of iron after exposure to coke...	0.462	0.076	0.098	0.098

The great difference between the amount of sulphur absorbed from the untreated coke and the small amount from the limed coke is apparent at once. It is to be noted that magnesia and soda are also very efficient in preventing the sulphur from going into the iron. In every case the corresponding metallic sulphide has been formed, all of which have dissociation pressures far below that of ferrous sulphide.

The sulphur reactions of the sponge iron zone may be summed up in the general phenomenon of a transfer of the sulphur from the coke to the iron and the lime. The sulphur given up by the coke comes from the ferrous sulphide, probably none comes from the solid solution form of sulphur. The presence of lime in intimate contact with the coke practically prevents the sulphur of the coke from reaching the iron.

The third zone of the blast furnace of interest in the sulphur reactions is that of preliminary slag formation. In this region the lime begins to unite with the siliceous impurities of the iron, and the result is a viscous, limey slag, which will have a tendency to coat the iron and also the coke. When this occurs the transfer of the sulphur from the coke to the iron will be practically stopped, for the path over which this transfer took place in the sponge iron zone will be blocked by this basic slag, which will have a great affinity for the sulphur. The zone of preliminary slag formation is, therefore, a region where the contamination of the iron by the sulphur of the coke ceases.

The combustion zone is the final region where the sulphur reactions occur. The coke is entirely consumed and the ash of the coke unites with the limey slag to form a fluid slag of the composition desired. The sulphur of the coke probably burns to sulphur dioxide, which is quickly reduced to free sulphur, hydrogen sulphide, or carbon oxysulphide. Carbon bilsulphide might also result from this reduction. In any case, the hot lime and the iron, now in a liquid state, will compete for the sulphur. At this temperature the sulphur will not remain long in the gases of combustion. It is probable that the sulphur of the coke released in the combustion zone will enter the slag in preference to the iron. This reasoning is based on the intimacy of the contact, for the drops of liquid iron are surrounded to some extent by the slag. Of more importance than this, however, is the fact that the coke, just before combustion, becomes impregnated with the slag. This is an important point, as the major portion of the coke sulphur is released at this stage of the process, and the conditions would seem to be ideal for its complete absorption by the slag.

Sulphur Approaches Equilibrium

Despite the probability that no sulphur enters the iron in the combustion zone, the sulphur content of the iron already has become higher than is desirable in the finished product from its contact with the coke in the spongy iron zone. This means that the iron must be desulphurized by the liquid slag in the vicinity of the combustion zone of the furnace.

As the iron probably contains more sulphur when it enters the final combustion and slagging zone of the furnace than when it settles out at the

bottom ready for tapping, there must be a transference of the sulphur from the iron to the slag. This probably never continues to the equilibrium point, because of the time factor, but it is desirable to bring the sulphur distribution to as near the equilibrium point as possible, so as to obtain a low sulphur iron. This has been the reason for the advocacy of liquid slags, so as to get good contact with the iron. The conditions which determine this distribution equilibrium value, such as temperature and the basicity of the slag, have been stated many times and do not require repetition here. The fundamental conditions for equilibrium between the sulphur of the iron and the slag is that the dissociation pressure of the calcium sulphide contained in the slag be equal to the dissociation pressure of the ferrous sulphide dissolved in the iron. The need for more data on the fundamental conditions that determine the sulphur equilibrium between the iron and slag cannot be too strongly emphasized.

This paper has been prepared with a rather thorough understanding of how the sulphur occurs in coke, and how these various sulphur forms found in coke behave under given conditions. However, it has been possible to formulate only probabilities, for the most part, as to the reactions that the sulphur will undergo in the blast furnace. Several small laboratory experiments have been performed to study the absorption of sulphur by iron from the coke, but it will be necessary to check all of this by studying the actual spongy iron, the coke, and the lime or slag from different zones of the furnace.

It is the intention to place special emphasis on the conditions under which the sulphur enters the iron, rather than the slagging conditions that promote its desulphurization. This latter has been studied to some extent, and, at least in its practical aspects, is understood fairly well. However, the factors involved in the entry of the sulphur into the iron are not well known. The main factor that affects the contamination of the iron by the sulphur in the upper part of the furnace, as shown by the small scale experiments described here, is the form in which the sulphur occurs in the coke. Further experiments on a large scale, using coke from which the ferrous sulphide form had been removed, will be of special interest. The action of lime in intimate contact with the coke in preventing contamination of the iron by sulphur is significant and worthy of further investigation on a larger scale. It is true that the liming of coke is not a new idea; it was investigated in some detail by the United States Steel Corp. about 10 years ago. However, not much seems to be known about the action of limed coke in the blast furnace under different operating conditions.

Summary and Conclusions

In another investigation, the bureau of mines has determined the manner in which sulphur is held in coke. Coke contains four characteristic sulphur constituents; namely, ferrous sulphide, adsorbed free sulphur, sulphates and sulphur held in solid solution in the carbon.

When coke goes through the blast furnace with the remainder of the charge, the sulphur of the coke undergoes the following reactions: 1. In the reduction zone, the free sulphur and the sulphates are reduced to ferrous sulphide; 2. In the zone of of spongy iron, considerable sulphur is taken up by the iron from the coke. The ferrous sulphide of the coke gives up sulphur at this point. Removal of this ferrous sulphide from the coke, or its conversion into calcium sulphide by liming the coke, largely eliminate this absorption of sulphur; 3. In the zone of preliminary slag formation, the absorption of sulphur by the iron is largely prevented; 4. In the combustion zone, the sulphur released from the coke is probably entirely absorbed by the slag. In this region, the slag also removes from the iron the excess sulphur, which entered the iron in the spongy iron zone.

A proposed further study of the sulphur reactions in the blast furnace as related to the forms of sulphur in the coke has been briefly outlined. It is proposed to place the emphasis on the factor causing the entrance of the sulphur into the iron rather than the desulphurization of the iron in the slagging zone.

Acknowledgement is given to A. C. Fieldner, supervising fuels chemist, Pittsburgh experiment station, bureau of mines, at whose suggestion this investigation was started.

What F. A. E. S. Is and What It Is For

ON JUNE 3 and 4, 1920, in Washington, D. C., representatives of 71 engineering and allied technical organizations gathered in conference and adopted a constitution and by-laws under the name of Federated American Engineering societies.

The first step in the organizing of independent societies into a common unit was taken on June 27, 1917, by representatives of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. The representatives of these organizations formed what was known as Engineering council.

It was the activity and scope of the work carried on by this Engineering council that caused the American Society of Civil Engineers to appoint a committee authorized to make a broad survey of the functions and purposes of the society so that a readjustment could be made which would place that organization on a better basis for assisting the profession of engineering in its service to the public.

This action was followed by the appointment of committees for the same purpose by the remaining three members of the Engineering council. From the membership of these committees a joint conference committee was formed, its purpose being to determine in what manner the four societies could co-operate on non-technical or welfare work affecting the relations of the engineer to, and his service in, public affairs.

A report was prepared by the joint conference committee and submitted to the four societies in September, 1919, proposing the formation of an inclusive and comprehensive organization.

The governing boards of the societies having representation on the joint conference committee, together with the American Society of Testing Materials and the trustees of the United Engineering society, unanimously requested the joint conference committee to call, without delay, a conference of representatives of national, state, regional and local engineering organizations, for the purpose of forming a comprehensive organization such as recommended by the committee. A call was subsequently issued by the joint conference committee, to 110 engineering and allied

technical organizations. Representatives of 71 of these organizations answered the roll call and founded the F. A. E. S., an organization of societies, as distinguished from that of individuals.

The preamble to the constitution of the F. A. E. S., which may be called the keynote of its purpose and its ideal, states: "As service to others is the expression of the highest motive to which men respond and as duty to contribute to the public welfare demands the best efforts man can put forth: Now, therefore, the engineering and allied technical societies of the United States of America, through the formation of the Federated American Engineering societies, realize a long cherished ideal—a comprehensive organization dedicated to the service of the community, state and nation."

Each member society of the Federation with a membership of over 100 persons is entitled to representation on the American Engineering council, which might properly be termed the legislative committee of the F. A. E. S. Member societies with a membership over 1000 are entitled to one representative on the American Engineering council for each 1000 members or fraction thereof.

Herbert Hoover First President

The first meeting of the American Engineering council was held in Washington Nov. 18, 1920, with 21 member societies officially present. Many phases of the new organization were perfected and officers chosen. Herbert Hoover was selected as the first president of the federated societies.

As the American Engineering council would be rather an unwieldy body for purposes of governing the allied societies, the executive board was formed, being the executive or administrative committee of the American Engineering council. The 30 members of this board must be members of the council. The board membership is composed of six officers elected by the council, eight regional directors selected by members of the council from state, regional and local societies of each region, and 16 elected by the delegates of the several national societies. The number of members to be elected to the board by each national society is determined on a pro rata basis. The members of the council, from each national society having more than one member on the council, elect from their number those that are to serve on the executive board.

A still more highly centralized governmental body is provided for in the committee on procedure, which is the executive committee of the executive board. The members of this committee consist of the elected officers of the council, namely, president, four vice-presidents, treasurer and the appointed chairman of the finance committee.

Under supervision of the committee on procedure are the following standing committees, the members of which must be members of the executive board: Constitution, finance, membership and representation, public affairs, publicity and publications, and procedure.

An executive secretary, elected by members of the executive board carries on the active program of the federation through the supervision of special committees. The personnel of these committees may consist of any members of the federation although the committee chairmen are usually members of the council. Committees which are now functioning are:

1. Elimination of waste in industry.
2. Foreign relations.
3. Federal water power.
4. Industrial ideals.
5. Patents.
6. Pins and emblems.
7. Reforestation.
8. Classification and compensation for engineers.
9. Plan for investigations made under jurisdiction of Federated American Engineering societies.
10. Regional activities.
11. Registration of engineers.
12. Types of government contracts.
13. Waste in agriculture.

Not a "Welfare" Organization

"The federation is not a 'welfare' organization for the benefit of individual engineers," says the official publication of that organization. It is not an organization of individuals in any sense of the word, in membership, action, benefits or accomplishments. It is a grouping of engineer-

(*Concluded on page* 884)

Outline Growth of New Organization

A LACK of clearness has been expressed by many engineers of the relation of various local and national engineering societies to the Federated American Engineering societies and the American Engineering council. The accompanying article is a resume of a summary appearing in the February-March Bulletin of the Federated American Engineering societies outlining the history of the organization and the purposes for which it was formed. A list of member societies is presented and the status and relation to one another of of important committees is explaincd.

Comparative Membership of F. A. E. S

No.	Name	January 1 1921	January 1 1922	January 1 1923	Comments
		No. of Members			
1.	American Society Mechanical Engineers	13,137	15,522	17,416	
2.	American Institute Electrical Engineers	12,000	13,682	14,387	
3.	American Institute Mining and Metallurgical Engineers	8,265	8,960	9,363	
4.	American Institute Chemical Engineers	440	523	564	
5.	American Society of Agricultural Engineers	314	683	683	
6.	Alabama Technical association	118	119	119	
7.	Associated Engineers of Spokane	58	98	110	
8.	Associated Engineering Societies of St. Louis	937	837	837	
9.	Cleveland Engineering society	960	....	....	Withd'n Jan. 1, '22
10.	Detroit Engineering society	583	534	445	
11.	Engineering Association of Nashville	125	118	114	
12.	Engineers' Club of Baltimore	225	766	....	Withd'n Jan. 1, '23
13.	Buffalo Engineering society	400	273	346	
14.	Grand Rapids Engineering society	125	125	151	
15.	Kansas Engineering society	190	262	264	
16.	Louisiana Engineering society	272	295	295	
17.	Mohawk Valley Engineers' club	147	147	147	
18.	Society of Industrial Engineers	400	488	538	
19.	Technical Club of Dallas	131	180	176	
20.	Taylor society	395	656	....	Withd'n Apr. 1, '22
21.	Washington Society of Engineers	475	519	529	
22.	York Engineering society	143	143	148	
23.	Boston Society of Civil Engineers	880	929	932	
24.	Duluth Engineers' club	150	200	208	
25.	Engineering Society of Milwaukee	220	220	241	
26.	Iowa Engineering Society	357	540	530	
27.	American Society of Safety Engineers	253	243	254	
28.	Jamestown Engineering society	80	80	80	
29.	Vermont Engineering society	152	184	204	
30.	Engineers' and Architects' Club of Louisville	....	153	233	Admit'd Oct. 10, '22
31.	Engineers' Club of Columbus	....	209	273	Admit'd Jan. 6, '22
	Total number of members of member societies	41,932	47,688	49,587	
	Less Taylor society		656		
			47,032		

Number societies as of Jan. 1, 1923—28.
Since Jan. 1, the Indiana Engineering society has voted to join the federation, bringing the number of societies again up to 29.

Throws Light on Steel Melting

Experiments Which Were Made Under Stress of War Necessity Result in New Procedure for Melting Steel Scrap in the Cupola—Priming Charge of Pig Iron Is Deemed Imperative To Maintain Fluidity

BY G. MUNTZ

SO-CALLED semi-steel has been produced in converter foundry practice for over 30 years, the object being to produce not a close-grained iron, but to reduce the percentage of low phosphorus pig iron in the cupola charges. It was sought thereby to insure full consumption of the home-made steel scrap and also to enable the steel foundryman to reduce his cost of production by the use of foreign steel scrap, which as a rule sells for a fraction of the cost of low-phosphorus pig iron.

Cupola practice has reached its greatest efficiency in converter steel foundries, and converter operators often smile at the boasts of their gray iron *confreres* who point proudly to cupola charges containing 40 per cent and over of steel scrap. Converter operation, for many years, limited steel scrap admixtures to 30 per cent; not because higher precentages of scrap could not be melted in the cupola, but on account of building up those elements which could not be eliminated in the converter, notably sulphur and phosphorus.

European cupola practice for many years, has called for 40 per cent steel scrap admixtures when producing the dense metal poured in such castings as locomotive cylinders and others of similar nature; but they never thought of naming it semisteel. It was considered just a good grade of gray iron. To this day, few gray iron foundries care or dare to exceed a 40 per cent scrap burden.

Costs Steadily Increasing

In converter operation, we have been faced for years by increasing costs of low phosphorus pig iron, and willy nilly have been obliged to add to our steel scrap burden, in self protection.

When the great war broke out, the supply of basic refractories promptly was limited, due primarily to the stoppage of Austrian magnesite exports, and the result was an increased use of the acid process. The acid process, whether converter or open hearth, calls for the use of raw materials low in sulphur and phosphorus, and early in 1915 it became evident that low phosphorus pig iron soon would reach unheard of prices. In fact, prices which had been fairly steady at $16.00 per ton began climbing and never stopped until late 1920 when a maximum of $57.00 per ton was reached.

Needs Force Scrap Use

To those of us who are interested in converter operation, the proposition became one of life or death, and means had to be provided promptly to do away with the use of low phosphorus pig iron. Steel scrap being the only possible substitute, our efforts naturally centered in the melting of increasing percentages of scrap in the cupola.

In the rear of our office building we have a combination garage and miniature foundry, the melting equipment consisting of a 12-inch home-made cupola. The blast is supplied underground from the basement in our office, by a small Roots blower.

To our gray iron friends who seldom use anything smaller than a 30-inch cupola, it will seem that no small amount of nerve was required to experiment on all steel scrap cupola melting in a 12-inch baby cupola. However, the year 1915 was no time to ask favors of friends and the idea of inducing anyone to give us the freedom of their foundry for experimental purposes was out of the question. Therefore, we started to melt 40 per cent steel scrap in the 12-inch cupola and after many instances of the usual freezing on the hearth when scrap burdens were increased, we succeeded in melting 100 per cent steel scrap in the baby furnace.

It is needless to say that cupola practice when melting all steel scrap, does not resemble the usual procedure, and new standards had to be developed to insure a continuous liquid stream at the tap hole, without the often encountered freeze up at the breast.

Here we can best quote the specifications of patent No. 1,336,256 issued on April 6, 1920, to E. Roubieu and the writer:

In melting steel scrap not only is a higher temperature necessary than for melting pig iron, but also a greater quantity of fuel than is necessary to produce that higher temperature, since the steel absorbs from the fuel a certain amount of carbon, which otherwise would contribute to increase temperature. In other words, fuel must be supplied in sufficient quantity not only to supply the inevitable recarburization of the steel but also to fuse the metal at a temperature high enough to maintain it in molten condition on the hearth of the cupola and prevent it from solidifying there. This trouble has been understood and it has been attempted to meet the situation by increasing the amount of fuel which usually is inserted between alternate charges of metal. For the reason hereafter explained, this has failed to accomplish the desired result, and it has become general practice to use only a slightly increased amount of fuel and to limit the proportion of scrap to pig iron to from 30 per cent to 40 per cent of scrap to 70 per cent to 60 per cent of pig and even a lower proportion of scrap in order to keep the molten product from solidifying on the hearth. Furthermore, the practice heretofore followed has been to charge the scrap directly upon the fuel and the pig above the scrap, with the thought that the pig would melt first and run down through the scrap and thus aid in the fusion thereof.

Our investigations have disclosed that the practice heretofore followed has been defective in several respects: First, by reason of failure to heat properly the hearth of the furnace before actual melting is begun; second, in failing to subdivide the alternate charges of metal and fuel to a sufficient extent to obtain the desired result; and third, in failure properly to charge the metal upon the fuel bed or fuel charges.

Charge Is Subdivided

When the usual full-sized charge of metal is fed to the cupola and contains a large proportion of steel scrap, the increased amount of fuel required to melt and recarburize the steel scrap is too deep to be completely ignited simultaneously throughout its depth, with the result that the lower portion of the fuel is reduced to ash before the upper portion is fully fired and the portion first burned is exhausted without accomplishing any perceptible fusion of the superimposed charge of metal. Second, when the upper portion of the fuel bed incandesces and reaches the temperature necessary for the fusion of the metal charge, it possesses too little body to melt the scrap and bring it to the high temperature necessary to maintain it in fused condition when it falls upon the hearth. We have found that this difficulty is eliminated completely by subdividing the charges. If, for instance, the normal charge is 1200 pounds of metal, we divide this in half and make our charges 600 pounds of metal and in like manner halve the fuel charge, so that if the latter comprises normally 120 pounds of coke, we use for our sub-divided charge, say 60 or 65 pounds of coke. Moreover, we have discovered that the assumption that the pig will melt first when charged above the scrap, is erroneous and that in fact the scrap melts first and the pig afterward so that no advantage is obtained by charging in the customary manner, but on the other hand an advantage is lost since if pig iron is charged directly on the fuel,

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its fusion produces a bath of metal on the hearth which owing to its high temperature and its lower solidifying point will aid in maintainng the subsequently melted and recarburzed steel scrap on the hearth in the proper fused condition.

Moreover, by charging the pig first, it is assured that the molten product on the hearth and at the tap hole is of such character that it remains in fused condition at a lower temperature than the molten scrap and so prevents the formation of a solid or semiplastic plug at the tap hole thus affording easy tapping—a most important consideration. If the metal falling first on the hearth is the fused scrap, which requires a high temperature to maintain its fused condition, it is extremely likely that a plug of solidified metal will form at the tap hole which cannot be punctured by the tapping bar, with the result that the entire molten mass solidifies on the hearth of the cupola before it can be withdrawn.

Differences Are Marked

Other variations from established practice will be observed from the following example of the manner in which melting is accomplished in accordance with our process. Assuming the cupola to be empty and the lighting and the tap holes at the hearth level are open, a fire is built upon the hearth and a suitable fuel bed extending from 12 to 14 inches above the top tuyeres laid upon it. This is ignited and after it is well fired, a 2½ to 3-foot layer of fuel is charged and the blast applied. The fresh fuel forms a cork or plug which forces the heat down upon the hearth, the lighting and tap holes still being maintained open to permit the escape of the products of combustion. This preliminary heating of the hearth, which is continued for 15 to 25 minutes, brings the hearth to a high temperature, which is desired for the reception of the molten metal. A further supply of fuel then is charged upon the fire bed, if necessary, to bring the upper level of the fuel to the melting zone, that is to say, 14 or 15 inches above the tuyeres and the lighting door and the tap hole are closed so that the products of combustion will pass normally upward to the stack. Upon this fuel we charge a small quantity of steel scrap. Assuming the cupola to be 36 inches in diameter inside the lining, of a capacity of about 5 tons per hour, the first metal charge would be about 200 pounds of pig iron followed by 400 pounds of steel scrap, instead of the usual charge of 1200 pounds of metal. Upon this we add a layer of fuel, say 65 pounds of coke then a layer, say of 600 pounds, of scrap, and so on. As the charges move downward through the melting zone above the tuyeres the relatively thin fuel beds are quickly and completely ignited throughout their depth and give their entire heat to the superimposed charge of metal which fuses rapidly so there is practically no interruption of the rain of molten metal to the hearth.

Owing to the high temperature of the fused scrap and the relatively low melting point of the primer of pig iron, the resulting molten product has no tendency to solidify or the tap hole to become choked. The charges of scrap may succeed each other continuously without interruption as long as the operation of the cupola is continued and in this case the proportion of the original quantity of priming pig to scrap is negligible. However, if the operation is interrupted, a priming charge of pig iron is introduced at such a time that its subjacent fuel bed reaches the melting zone almost simultaneously with cutting off of the blast, so that it is in position to form a primer when the operation of the cupola is resumed. When the cupola is associated with a converter, the successive charges are so calculated that upon the halt of the operation of the cupola, a priming charge of pig iron will be in a position to enter the melting zone when the blast again is started. Preferably each charge will comprise a small proportion of pig iron to steel scrap so that the blast may be cut off at any time and the presence of priming pig assured when the blast is started again.

While any suitable metal may be employed for the primer, it is an added economy to use a portion of one of the melts of the preceding day; thus a few special charges may be melted at the end of every day and divided into small portions and these portions used to form the primers for the operations of the next day. This is merely a matter of added economy since the cupola product is less expensive than pig iron. Ferrosilicon is preferably used as a primer where the cupola is associated with a converter for the production of steel, as this special pig iron supplies the necessary amount of silicon in the molten product to insure satisfactory refining in the converter. We also prefer to use steel scrap low in phosphorus and sulphur inasmuch as no refining for these elements is contemplated in the converter. Of course, it is understood that ingredients may be added as necessary to vary the product as may be desired for different types of iron or steel.

Typical Charge Suggested

As an example of suitable charges for a 36-inch cupola associated with a converter for the production of steel, the following may be given, using standard 9 per cent ferrosilicon:

CHARGE FOR 9 PER CENT FERROSILICON

Per cent	Pounds		Silicon Per cent
8	50	priming pig at	1.5
19	115	ferrosilicon at	9.0
73	435	steel scrap at (about)	0.2
100	600	converter charge at (about)	2.0

Using 12 per cent standard ferrosilicon the following proportions would be utilized:

CHARGE FOR 12 PER CENT FERROSILICON

Per cent	Pounds		Silicon Per cent
8	50	priming pig at	1.5
14.5	87	ferrosilicon at	12.0
77.5	463	steel scrap at about	0.2
100	600	converter charge at about	2.0

Preferably each charge will contain substantially the proportions specified where the cupola is used with a converter.

Try To Reproduce Accident

Where the cupola is used for gray iron or malleable iron foundry work the first one or two charges will comprise, about 15 per cent pig iron and 85 per cent steel scrap, and thereafter steel scrap alone, adding suitable ingredients, depending upon the character of the final product desired. It is possible in any case to use a high percentage of pig iron in the initial one or two charges and a higher proportion of scrap in the later charges. but this is not safe when the cupola is associated with a converter, unless the number of charges for a blow of the converter can be predetermined with accuracy and a suitable primer of pig iron charged in position to initiate the succeeding operation of the cupola after it has been halted temporarily to draw off for the converter.

It is well known that while searching for certain results, many things of interest crop up on the way. One *accident* brought gladness to our hearts and led us for a time to deviate from the plans we had laid down at the beginning of the experiments.

One day, while we had lapsed in the usual precautions to prevent scaffolding of our charges, the latter *arched* for quite a time, not as would be the case in a larger cupola; but the speed of descent was such as might be encountered in a combination cupola and converter. In other words, when we tapped the cupola we actually obtained steel of excellent quality. Therefore, we decided to reproduce the *accident* as a continuous process; but to this day we have failed.

To those who like to blaze the trail in things metallurgical, here is an unexploited gold mine. We have done our share in the endeavor to produce *steel* direct from the cupola, and as time, means and opportunity to continue research are not available to us, we will leave the solution of this problem to others.

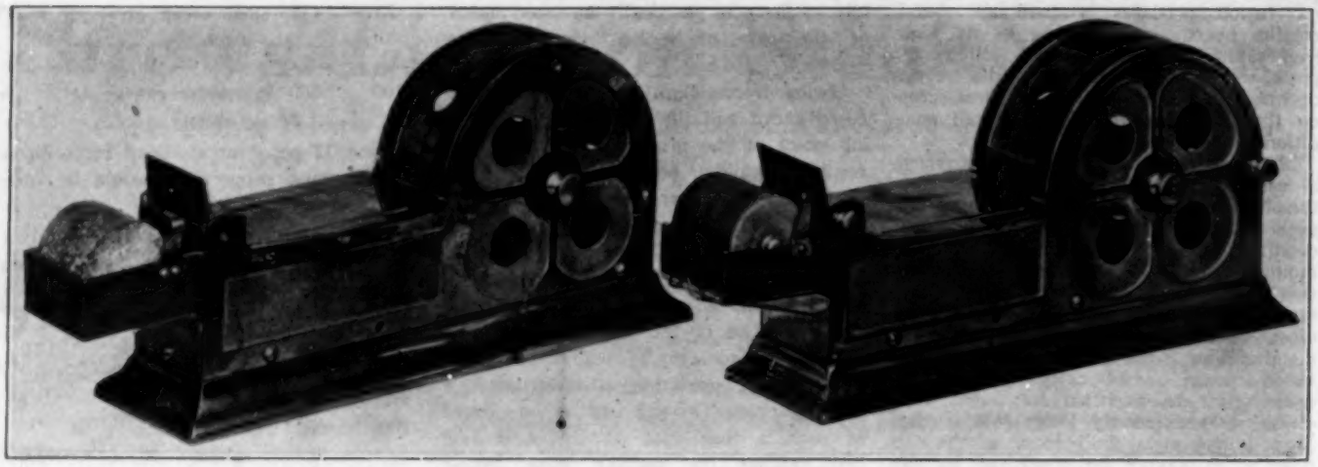

Fig. 1—By redesigning the tape moistening machine shown at the left so as to use pressed metal as shown in the view at the right, the weight was reduced by 50 per cent

Planning for Pressed Metal Work

Engineering and Estimating Departments Co-operate Closely in Determining Production Methods and Approximate Costs when a New Product Is Developed—Extensive Data as Well as Short Cuts Facilitate Making Calculations

FOR the purpose of this discussion pressed metal working plants may be divided into two classes, those with an engineering department and those without. Many manufacturers operating presses merely perform the actual work of transforming sheet metal into various products, engaging other interests to design the tool equipment and sequence of operations. It is common for such companies upon the receipt of new work to be estimated upon, to send the specifications to these independent interests of toolmakers where the various operations are figured and the tool equipment roughly designed. The toolmaker in this case usually furnishes an estimate of the cost of tool equipment and also an outline of the number and kind of operations. The toolmaker virtually is the engineering department. This is a form of specialization which works satisfactorily in many cases.

Closer co-operation often is obtained, however, by providing an engineering department which is an integral part of the manufacturing plant. When this is done, new work is studied from a less partial viewpoint. In one sense the engineering department is working for the purchaser. In this case it becomes necessary not only to study the specific part in question, but the intended use of that part and its relation to other parts in the accomplishment of the final purpose. The engineering department of a metal working plant usually includes the estimating department, and the two work in close co-operation from the time a sample is received until the product is complete. Each job as it arises calls for individual study. It is difficult to give standards of practice. Usually the engineer in charge of the work receives a sketch of a casting, or perhaps a casting itself, from a customer. From this he works up his own sketches showing the method of producing a similar piece or a piece to fulfill a similar purpose using pressed metal. Before going far with the new design, it is necessary to prepare an estimate, for after all cost of the completed part is the chief consideration in most cases.

Devise Forms to Reduce Work

Engineers recently have given a good deal of attention to the details of estimating in connection with pressed metal plants. In some cases standard forms have been devised in order to reduce the work of the estimator and to decrease the possibility of error. Such a form should include a bill of material from which the material cost is figured, and also the estimated cost of operation. Each operation should be listed with the number of pieces turned out per hour, the cost per hour, and from this the cost per thousand should be calculated. Often it is advisable to include in this table of operation cost, the tool cost per thousand pieces for each operation. The initial tool cost is best figured in a separate column, and this divided by the number of thousand pieces in the order, of course, will give the tool cost per thousand. A summary table giving the material cost, the operation cost, factory cost, and selling cost will serve as a reminder that items under each of these headings should be included in the total estimate.

In the strict use of the term most pressed metal work today consists in forming rather than drawing. Forming is sometimes spoken of as breakdown drawing, and consists virtually in gradually reshaping or remodeling the metal from one form to another without appreciably changing the thickness at any point. For example, in making a deep cup, a shallow one is made first and successive operations reform this into deeper and deeper sections. The metal which forms the gradually increasing length of walls is obtained by decreasing the cup diameter. This means that the initial diameter, or that of the shallow cup, must be considerably greater than the final diameter, or that of the deep cup. If the thickness of the metal is not altered, the area of the developed walls of a cup on a flat surface should remain constant. This, of course, gives a means of figuring back to meet the initial diameter for any final size of cup.

Experience has shown that the first cup should be made with a diameter four-sevenths of the diameter of the circular blank from which it is formed.

Thus a 7-inch circular blank of almost any thickness of metal up to ¼ inch should first be formed into a cup 4 inches in diameter in order to obtain the best results in the further working of the metal. This is the case with steel and holds true with but slight variations for other metals. As a means of reducing the work of designers and estimators, it is advisable to have at hand a series of tables following the dimensions of successive operations when starting with disks of varying diameters. When such tables are made up, it is an easy matter, when desiring to make a cup of any dimension, to locate the position of this cup in the tables, then to trace back and find the diameter of the blank from which the cup should be made. With steel it is the usual practice to decrease the diameter of the cup 7/64 to 9/64 inch at each operation. From this it is seen readily that deep cups require a large number of operations. The operating cost bears a more or less direct ratio to the number of operations, making it possible to combine standard costs with the tables just mentioned. Some engineering departments have gone to a great deal of expense to prepare elaborate tables and diagrams to assist in estimating and designing. These tables and charts furnish short cuts which save the time of skilled men over and over again as each job comes up for consideration. When it is considered that in the average large plant approximately 10 per cent of the total number of estimates develop into orders, it is easily seen that a considerable study and expense is warranted in making up charts and tables to reduce estimating and designing costs.

Processes for producing steel parts by pressing and forming similar to most innovations in methods of manufacture, have had to fight for recognition. First the pressed metal plants had to be convinced of the feasibility of producing new forms on stamping machines, and next it was necessary to convince the trade of the advantage in pressing from metal sheets certain parts previously made in other ways. A pressed metal part replacing a casting is usually lighter and often less expensive.

Wherever a casting has surfaces which require greater accuracy than that left by the usual cleaning process in a foundry, and yet which need not be held to extreme limits of accuracy, a pressed metal part to replace such a casting usually proves economical. This, of course, applies only when quantity production is considered since pressed metal work is essentially a quantity production process. Tool equipment is so expensive that for small orders of a thousand or under no competition is offered the foundry when price alone is considered. However, price is sometimes secondary and designs in pressed metal often better accomplish the purpose desired

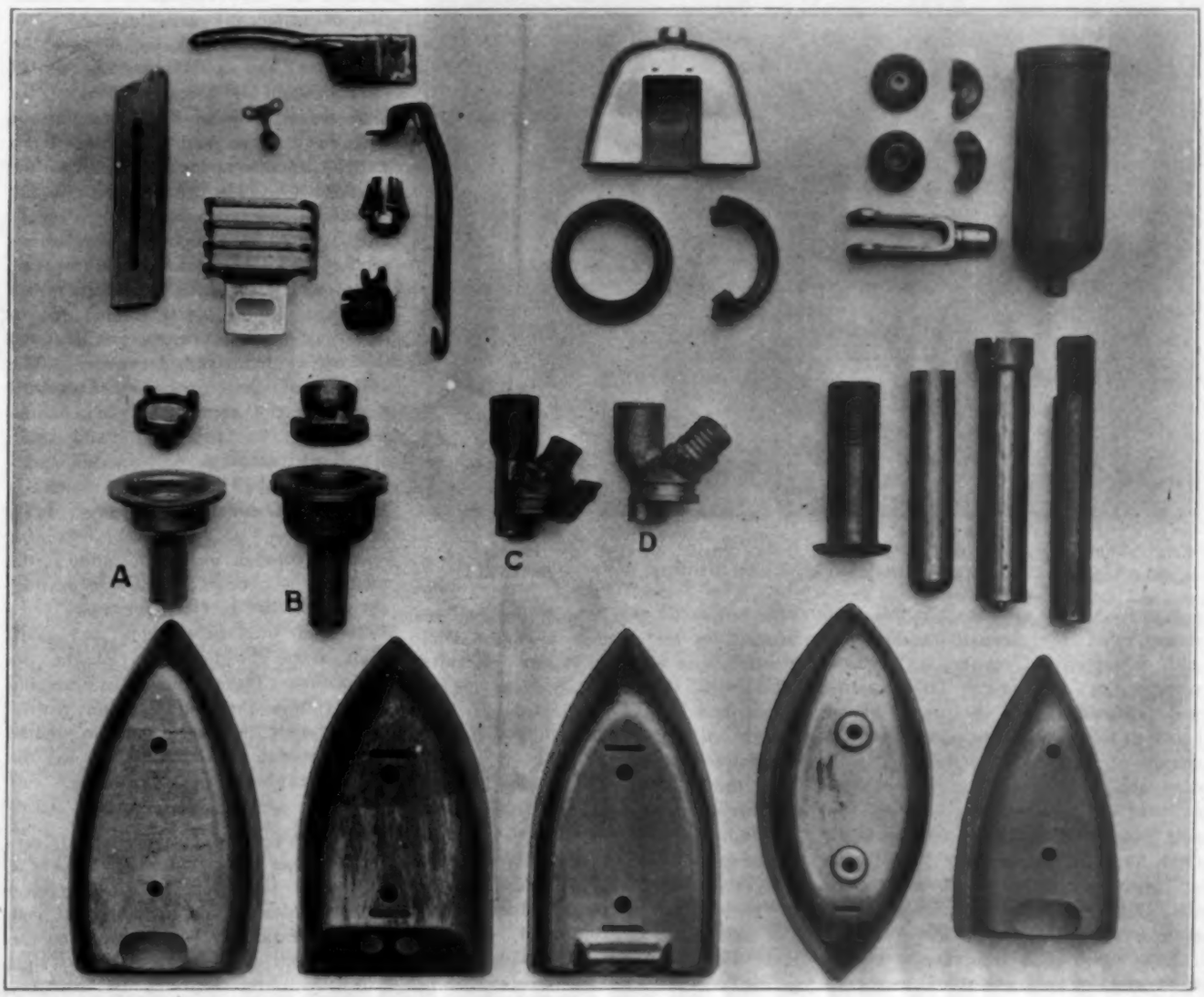

FIG. 2—A RANDOM LOT OF PRESSED METAL PARTS WHICH HAVE BEEN DESIGNED TO TAKE THE PLACE OF PARTS MADE BY OTHER METHODS

than any casting could. Generally speaking, pressed metal parts are lighter than corresponding castings. The two parts shown at *C* and *D* in Fig. 2 illustrate a typical case where a small casting has been redesigned so that it may be manufactured exclusively from pressed steel.

In this case the outside dimensions are limited, and at the same time a maximum internal area is desired. The casting on the right is an aluminum die casting with as thin walls as possible consistent with the desired rigidity and with a specified resistance against seepage of moisture. This casting was redesigned to be made from pressed metal and the new form is shown at the left. In this particular case the cost was not reduced, but at practically the same cost the inside area was increased about 30 per cent and the danger of blow holes or porous metal, which existed in the case of the casting, was eliminated entirely.

FIG. 3—THE DIAMETER OF A FLAT DISK FROM WHICH A CUP OF ANY DIMENSION IS TO BE MADE MAY BE READ DIRECTLY FROM A TABLE

Sometimes in redesigning a casting to permit construction of a certain part with pressed metal, greater simplicity is obtained without interfering with the original mechanical purpose. An example of this is seen in the case of the refrigerator drain trap shown at *A* and *B* in Fig. 2. This part as originally made up consisted of five pieces, four castings and a rivet. At first the engineering department, in undertaking to redesign this piece, adhered to the full five parts, the only difference being that each part was made out of pressed metal instead of being a casting. Before the tool equipment was made up, however, the whole design was studied in an attempt toward simplification, and eventually, after consultation with the purchaser, the simple form shown at *A* was evolved. The weight of the simplified piece is less than one-half of the original casting, and the only machine work required is threading, while in the case of the casting, it was necessary to machine surfaces on each of the different parts. In this particular case the cost on a fairly large run was reduced about 35 per cent as compared with the cost of castings.

Fig. 1 shows a tape-moistening machine made up, at the left, from castings, and on the right, one made from pressed metal parts. In this case the pressed metal designer followed the dimensions of the castings almost exactly. The pressed parts are, of course, thinner than the corresponding cast parts, but the important dimensions have been kept the same. The pressed metal machine weighs approximately half as much as the former model. The cost of the new machine was about 65 per cent of the cost of the old when made in a fairly large quantity.

What F. A. E. S. Is For

(*Concluded from Page* 879)

ing societies, with all its work and policies based on society memberships. The federation is an agency created and operated by engineers to increase their service to the public. Through the unity obtained and the strength gained in consolidation into the federation, that group of engineers has been able to promote successfully such benefits as reforestation and elimination of waste in agriculture.

In the first year of its existence the federation had a membership of 29 societies and 41,932 members. By 1923 three societies had dropped out and three more had been added, so that 29 organizations still form the F. A. E. S. The membership of the societies, however, had grown from 21,932 to 49,587, or over seven thousand in the three years existence. The three societies which withdrew from the organization were obliged to do so by financial reasons incident to the recent industrial depression. The officials of these societies expressed regret at the termination of connection with the federation and each stated an intention of becoming affiliated with the federation as soon as financial circumstances would again permit.

An accompanying table shows the member societies of the federation, their growth in memberships since 1921 and the withdrawals and additions since the formation of the organization. The Indiana Engineering society was the last addition to the organization, that society having voted at its recent annual meeting to join the federation.

Riffo Pope, vice president and general manager of the Monitor Stove Co., Cincinnati, has been appointed receiver of the company with instructions to continue operations. The receivership resulted from differences between banks, which had been financing the company, and the original owners. Assets are estimated at $2,000,000 and liabilities at half that amount.

Publishes Electrical Handbook

Mechanical World Electrical Pocket Book, 1923; imitation leather, 388 pages 4 x 6 inches; published by Emmott & Co., Ltd., Manchester, England and furnished by IRON TRADE REVIEW Cleveland, for $1.00 net.

This yearly edition contains the latest information of value to the electrical engineer in solving the daily problems encountered in the field. Additions have been made in this edition to keep pace with the ever changing conditions as encountered by the electrical engineer.

Prominent among the new features is the newly written section dealing with electrical measuring instruments, which describes the principal devices used in this connection. Another lengthy section, which has been completely revised deals with plant load and diversity factors. Notes on mercury rectifiers have been rewritten, and a new section introduced on power in alternating-current circuits. Additions made to various other sections include a note on the lead hydrate cell, on cyc-arc welding and on the transformer. A table of the properties of electric insulating materials also is included. Additions have been made in several other sections of the book.

* * *

Published Proceedings

Proceedings of the Twenty-fifth Annual Meeting of the American Society for Testing Materials; paper, 1022 pages 6 x 9 inches; published by the American Society for Testing Materials, Philadelphia.

This volume reports the proceedings of the twenty-fifth annual meeting of the American Society for Testing Materials held at Atlantic City, N. J., on June 27-30, 1922. The book contains the presidential address in which the progress made in a quarter of a century is reviewed and also the reports of the various committees on ferrous metals, nonferrous metals, cement, lime, gypsum and clay products and miscellaneous materials. Revised tentative standards are included. Part 2 of the proceedings, which is in the form of a second book, contains the various papers which were presented at the annual meeting. Comments and discussion on these papers are contained in this book.

* * *

Covers Oil Industry

The Petroleum Register, January Edition, 1923; cloth, 431 pages, 8½ x 11¾ inches; published semiannually by the Oil Trade Journal, Inc., New York, and furnished by IRON TRADE REVIEW, Cleveland, for $10.00 net.

This book is an international directory and statistical record of the world's petroleum industry, and contains maps of the principal producing fields together with the prospective oil territory in the United States and foreign countries. The constant expansion going on in the oil industry and the changes that occur quickly in the many phases of the trade, make the semiannual publication of this book advisable.

The text of the book contains lists of producers, refiners, compounders, grease, soap, and cutting compound manufacturers, marketers and jobbers, natural gasoline manufacturers, pipe lines, geologists, manufacturers and dealers in equipment, drilling contractors, oil associations, traffic guide to refineries, trade names, books on oil and gas, and a foreign division containing information on operating companies abroad. The buyers guide contains a list of articles used in the several branches of the trade together with the manufactured and distributing dealers supplying the same.

The information contained on the various companies is based on reports made by the companies to the publishers of the book. Information about more than 11,000 companies and persons engaged in the petroleum industry is supplied. In the back of the book will be found a complete index of the names of the companies and individuals listed, including those in the United States, Mexico, Canada and South America. The information listed in the book should be of value to every person engaged in the various branches of the petroleum industry.

* * *

Describes Gear Cutting

The Principles and Practice of Toothed Gear Wheel Cutting; by G. W. Burley; cloth, 460 pages 5 x 8¾ inches, published by Scott, Greenwood & Son, London, and furnished by IRON TRADE REVIEW, Cleveland, for $3.00 net.

The subject of tooth gear wheel cutting is of exceptional importance to various sections of modern engineering industry, especially those interested in the manufacture of machine tools, automobiles or their component parts. It is probable that much of the development that has been effected in these sections was made possible through improvements in the methods of forming gear teeth.

This book treats with both the theoretical and practical side of the subject, thereby supplying the needs of the engineering works apprentice, the machine shop supervisor and the technical student. The book should inspire attempts to deal more effectively with this department of engineering practice in engineering schools where in the past, little time has been devoted to the problems of gear cutting. At the same time the book should be of real service to the practical man by giving him an insight into the principles which underlie the different methods of forming gear wheel teeth and the different types of machines on which these methods are applied.

The book deals with the fundamental principles of toothed wheel gearing of all descriptions which are in modern use, the measurement of toothed gear wheels, nongenerating and generating methods of forming gear wheel teeth mechanically, and the machines and tools wherein these methods are applied. No attempt has been made to deal on the subject of toothed wheel gearing from the viewpoint of the designer. The work is well illustrated with sketches and photographic illustrations of machines or machining operations used in connection with the problems of this subject.

Discusses Action of Sodium Salt on Mild Steel

Dr. T. Swinden, of Sheffield, Carnegie Gold Medalist in connection with the Iron and Steel institute, and who has in the past done research in the employment of tungsten and molybdenum in steel, described some of the experiences of his special work during the war in a paper presented to the Birmingham Metallurgical society on Feb. 8. Under the title, "The Embrittling Action of Sodium Salt Solutions on Mild Steel," the speaker introduced a discussion in which various experiences as to chemically corrosive effects were related.

The author explained that the type of failure he proposed to examine was quite distinct from ordinary rupture arising from stressing beyond the normal static strength, or the fatigue type of fracture due to repeated or alternating stresses causing slip within the crystals. He found from experience that the embrittling action of certain salt solutions on mild steel is similar to the action of mercury and ammonium salts on stressed brass, causing what is now generally known under the term "season-cracking."

The particular problem under discussion was the failure of mild steel plates forming the base of large evaporating fans operating upon mixtures of sodium and potassium nitrates. Whereas these pans lasted for many years without any abnormal failure when evaporating brine, trouble was immediately experienced when the nitrate solution was substituted for brine and the failures were a matter of vital importance during the war period

Dr. Swinden described the experiments in some detail, pointing out that there was a considerable distortion of the plates, and that new pans cracked in a few hours. The trouble was limited entirely to the use of nitrates of the class described. Tests were made with a view to determining the influence of overheating, but it was concluded that in any case this could be only a minor accelerating factor The plates which gave way were mild open-hearth steel plates, both acid and basic, supplied by firms of repute of the kind used in shipbuilding, with a carbon content ranging between 0.05 and 0.25, and the sulphur and phosphorus at 0.06 or a little over. In a short time cracks developed, and the plates were reduced to a greatly deteriorated condition. A number of micrographs were shown illustrating the development of the cracks which, however, were most pronounced in the neighborhood of the rivet holes, or where the material had been subjected to stress. In one instance the crystals had fallen out, and it was noted that the steel was obviously seriously weakened about the crystal boundaries. A number of minute cracks to which attention was called were purely of an intercrystalline character.

The author suggested that since the action of nitrates is so distinctly different from that of chlorides selective chemical action operates in producing season-cracking in mild steel. The analagous action of sodium nitrate is already well known. He suggested that the embrittling action is due to an absorption in a state of solid solution of nitrogen or oxides of nitrogen from the nitrate solution by the material forming the inter-crystalline boundaries.

In the subsequent discussion various experiences were related. Dr. F. J. Johnson of Birmingham, for example, told how a brass wire had to be scrapped because it had come into contact with certain pickling salts. Other speakers considered that destructive effects are always apparent when nitrogen is chemically evolved.

J. E. Fletcher of Dudley, said the possibility of the oxide film which would almost invariably be met with in a rolled plate, might be partly accountable for the failure of the material.

Instrument Will Record Carbon Monoxide

The Pittsburgh station of the United States bureau of mines is devising an instrument to record continuously carbon monoxide over a range of concentrations up to about 10 parts in 10,000. When the instrument is set up, it will be calibrated with known mixtures of carbon monoxide in air. If it proves practicable, the instrument can be used around blast furnaces, metallurgical and chemical plants and other places where a carbon monoxide hazard exists.

New Automatic Starter Compactly Built

A new automatic autostarter for squirrel cage induction motors, in which a number of improvements in design is incorporated, has been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It is operated by a master switch, various forms of which can be employed; or for remote control, push buttons located at convenient points can be used. Full automatic operation is obtained by the use of a float switch or a pressure gage relay. Since the starter is automatic in operation, the motor is accelerated in a period consistent with the application and not according to the will of the operator. This gives the shortest time for safe acceleration and prevents the burning out of the transformer and abuse of motor.

Steel Spring Production Declines in 1921

Value of steel springs manufactured in the United States in 1921 was $31,750,000, contrasted with $51,480,000 in 1919 and $11,595,000 in 1914, according to the census bureau, Washington. Raw materials used cost $16,007,000 in 1921, $28,019,000 in 1919 and $6,143,000 in 1914. The number of establishments making steel springs was 126 in 1921, 105 in 1919 and 68 in 1914, with employes totaling 6535 in 1921, 10,401 in 1919 and 4240 in 1914.

Tests Effect of Ammonia on Surface of Steels

Tests to determine the effect of change in carbon content upon the method of attack of heated ammonia were recently made by the bureau of standards in co-operation with the fixed nitrogen research laboratory. Microscopic examinations were made of specimens representing a series of steels varying in carbon content from 0.02 to 0.98 per cent, exposed to a current of ammonia at temperatures in the range of 100 to 700 degrees Cent.

No change was observed in the specimens up to 400 degrees Cent. but at 500 degrees a film of white nitride was followed by the layer of nitride needles. At 600 dgerees Cent. this effect increased while at 700 degrees a new compound of nitrogen was formed following the film of white nitride layer.

At a temperature of 700 dergees Cent., with two low carbon steels, the nitride needles removed further from the edge to the center. They were absent at that temperature in high carbon steels of 0.49 per cent to 0.98 per cent. Twelve micographs were taken and a detailed report submitted to the fixed ntirogen laboratory.

Census Bureau Reports on Production of Safes

Thirty-four establishments were making safes and vaults in 1921, one less than in 1919 and two less than in 1914, states the census bureau, Washington, in a recent report.

The number of employes was 4205 in 1921, 3582 in 1919 and 3589 in 1914, salary and wage payments totaling $6,077,000 in 1921, $4,383,000 in 1919 and $2,726,000 in 1914. Raw materials used cost $7,440,000 in 1921, $6,609,000 in 1919 and $2,646,000 in 1914. The value of products was $19,725,000 in 1921, $15,294,000 in 1919 and $7,257,000 in 1914.

Late News of the Societies

Notes on Past and Coming Meetings of National and Local Trade and Technical Organizations

THE engineering section of the National Safety council has called a mid-year safety conference to be held in Chicago, April 17, in the auditorium of the Western Society of Engineers. Handling material, dust and fume hazards and traffic safety are the three main topics to be discussed at the meeting. The morning session will deal with the causes of accidents in the handling of materials and the use of conveyors and trucks in eliminating material-handling accidents. This will be followed by a general discussion of specific safety problems in the handling of materials. Preventing fire and dust explosions, health protection against dust and a discussion of practical methods of removing dust and fumes will follow in the afternoon session.

* * *

Discuss Power Transmission

Various phases of the subject of transmitting power by chain were discussed at the monthly meeting of the Hartford branch of the American Society of Mechanical Engineers which was held Monday, March 12, at the City club, Hartford, Conn. D. H. Mitchell of the Link-Belt Co. gave an illustrated talk on the general application of silent chain drives as an efficient medium for the transmission of power. F. G. Anderson, of the Morse Chain Co., spoke of power transmission by silent chain. Several other chain manufacturers were represented in the discussion which followed these two papers.

* * *

Purchasing Agents Meet

The New England Purchasing Agents' convention, which closed March 13 at Boston, was the largest meeting of its kind ever held in New England, nearly 500 registering the first day. In speaking of New England's buying power, O. L. Stone, general manager of the Associated Industries of Massachusetts, said that Massachusetts and Rhode Island possess the largest number of people to the square mile of any of the states. Massachusetts has 479 people to the square mile while New York has 217. Following Mr. Stone, John C. Howell of New York spoke on "The Business Outlook." L. F. Boffey, editor of *The Purchasing Agent*, spoke on the "Purchasing Power of Tomorrow." Other speakers were F. E. Spotter, Universal Winding Co., Providence, R. I., Frederick J. Hillman, president of the Purchasing Agents Association of Western Massachusetts, and J. C. Bennett of the Hampton Grinding Wheel Co., Springfield, Mass.

* * *

Favors Railroad Consolidation

Charles A. Andrews, former president of the Associated Industries of Massachusetts, spoke before the Affiliated Technical Societies of Boston, March 7 in favor of the consolidation of New England railroads with outside lines. Other speakers at the meeting were Dr. Samuel W. Stratton, president of the Massachusetts Institute of Technology, Edward E. Whiting of the *Boston Herald* and M. N. Baker of the *Engineering News-Record*. A resolution calling upon the government for speedy trial of the engineers and contractors recently indicted by the federal government for alleged frauds in war construction work was unanimously adopted.

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Publish A. I. E. E. Nominations

Announcement has been made by the board of directors of the American Institute of Electrical Engineers of the following nominations: For president, Harris J. Ryan, Stanford University, Cal.; for vice presidents, William F. James, Philadelphia, H. E. Bussey, Atlanta, Ga., Herbert S. Sands, Denver, J. E. Macdonald, Los Angeles, S. E. M. Henderson, Toronto, Ont.; for managers, H. P. Charlesworth, New York, William M. McConahey, Pittsburgh, W. K. Vanderpoel, Newark, N. J.; for treasurer, George A. Hamilton, Elizabeth, N. J. The election ballots, including the names of the directors and nominees and all other eligible candidates, will be mailed to the members before April 1.

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English Metallurgist Speaks

Dr. Walter Rosenhain, chief of the metallurgical department of the National Physical Laboratory of Teddington, England, began a series of lectures on March 14 before the engineering classes of University of Michigan at Ann Arbor, Mich. His first lecture took place Wednesday evening when his topic was "Structure and Constitution of Alloys." On Thursday afternoon Dr. Rosenhain discussed "Strain and Fracture in Metals," and on Friday "Aluminum Alloys."

Convention Calendar

April 3-7—American Chemical society. Spring meeting New Haven, Conn. L. Parsons, P. O. Box 1515, Washington, is secretary.

April 18-19—National Metal Trades association. Annual convention, Hotel Astor, New York. Louis W. Fischer, Peoples Gas building, Chicago, is secretary.

April 18-19 National Metal Trades association. Annual convention, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle street, Chicago, is secretary.

April 18-20—Society of Industrial Engineers. Spring convention in Cincinnati. The headquarters of the society are at 327 S. La Salle street, Chicago.

April 19-21—American Gear Manufacturers' association, annual meeting, Hotel Cleveland, Cleveland. T. W. Owen, 2443 Prospect avenue, Cleveland, is secretary.

April 24-27—American Hardware Manufacturers association. Spring convention, Windsor hotel, Jacksonville, Fla. F. D. Mitchell, 1819 Broadway, New York, is secretary.

April 25-27—National Foreign Trade Council. Annual convention in New Orleans. O. K. Davis, 1 Hanover square, New York, is secretary.

April 28-May 3—American Foundrymen's association. Annual convention and exhibition at Public Hall, Cleveland. C. E. Hoyt, 140 South Dearborn street, Chicago, is secretary.

May 3-5—American Electrochemical society, semiannual meeting, Hotel Commodore, New York. Colin G. Fink, 327 South La Salle street, Chicago, is secretary.

May 7-9—American Association of Engineers. Annual convention at Norfolk, Va. C. E. Drayer, 63 E. Adams street, Chicago, is secretary.

May 15-16—National Pipe & Supply Association. Convention at Cincinnati. Geo. L. McIlvane, 909 Oliver building, Pittsburgh, is secretary.

May 17-19—National Supply and Machinery Dealers association; Southern Supply and Machinery Dealers association; and American Supply and Machinery Dealers association, triple convention, Cincinnati. F. D. Mitchell, 1819 Broadway, New York, is secretary.

May 28-31—American Society of Mechanical Engineers. Spring meeting at Montreal. Calvin W. Rice, 29 W. Thirty-ninth street, New York, is secretary.

June 14-15—American Society for Steel Treating. Spring sectional meeting, Hotel Bethlehem, Bethlehem, Pa. W. H. Eisenman, 4600 Prospect avenue, Cleveland, is secretary.

June 25-26—American Society for Testing Materials, annual meeting at the Chalfonte-Haddon hall hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary.

National Acme Head Sees Gain in Tool Trade

The National Acme Co., manufacturer of machine tools, Cleveland, reports manufacturing profits for 1922 of $575,034, an operating loss of $170,173 and net loss, after deductions, of $805,010. This reduced the company's surplus to $731,764. President A. W. Henn in his report to stockholders states that although 1922 showed a loss it is confidently expected that the corner has been definitely turned. During the first two months of 1923 the company booked $2,000,000 of business. This closely approximated total bookings in 1921. Some slight improvement is reported in foreign business. The company reduced its bank indebtedness by $300,000 in 1922.

Yale and Towne Net Up

Net profits of $2,406,664 for the year ended Dec. 31, 1922, after allowing for depreciation and federal taxes are reported by the Yale & Towne Mfg. Co., New York. In 1921 the company reported net porfits of $1,299,038 after the same deductions, which was equal to $25.98 a share on the $4,988,774 capital stock of $100 a share outstanding. The profit and loss surplus on Dec. 31, 1922, was $8,035,148, according to the balance sheet.

Brier Hill Reports Loss

The Brier Hill Steel Co., Youngstown, O., recently absorbed by the Youngstown Sheet & Tube Co., reports net profits from operations of $98,802 in 1922. After charges for interest, depreciation and depletion there was reported a deficit of $1,347,577. The deficit after payment of $350,000 for dividends was $1,697,577.

Deposit Midvale Bonds

More than two-thirds of the bonds of the Midvale Steel & Ordnance Co. have been deposited with the Guaranty Trust Co., New York, under the agreement calling for the exchange of these bonds into new securities to be issued under the Bethlehem Steel-Midvale merger. Minority stockholders of the Cambria Steel Co., a Midvale subsidiary, have developed some opposition to the merger.

Penn Seaboard

A net operating loss of $177,199 is reported by the Penn Seaboard Steel Corp., for the year ended Dec. 31, 1922. After adding interest charge and other fixed expenses there was reported a net deficit of $515,447. The general balance sheet at the close of the year showed net current assets of $2,729,164 and net current liabilities of $1,421,384. President J. B. Warren in his statement to stockholders said:

"During the first half of the year 1922 the volume of tonnage obtainable for your corporation's plants and the prices at which the products had to be sold to meet competition resulted in losses which could not be offset by the general improved conditions due to higher selling prices and greater tonnage which prevailed during the latter part of the year."

Air Brake Earns More

Total sales of the New York Air Brake Co., in 1922 were treble the total for the previous year, according to the annual report of the company. The gross was $6,711,462 against $2,434,744 in 1921. Profits of the company in 1922 amounted to $958,741. This compared with a loss of $458,699 in 1921. The comparative income account follows:

	1922	1921
Sales	$6,711,462	$2,434,744
Manufacturing costs	4,502,826	1,975,079
Manufacturing profit	2,208,636	459,665
Other income	34,355	48,114
Total income	2,242,991	507,779
Expenses, taxes, etc.	847,779	490,765
Interest, etc.	436,471	475,713
Net profit	958,741	*458,699
Class A dividends	84,000	.....
Common dividends	.....	375,000
Surplus	874,741	†833,699

*Loss. †Deficit.

Loss Is Reduced

The annual report of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., for the calendar year 1922 shows a net loss of $480,231 after interest and depreciation, as compared with a net loss of $1,148,827 in 1921.

Carnegie Boat Launched

Pittsburgh, March 20.—What is said to be one of the most modern steamboats on inland rivers was placed in commission recently by the Carnegie Steel Co. The "A.O. Ackard," as the ship will be known, was named after Captain A. O. Ackard, who is in command of the company's large fleet of boats and barges as its general superintendent of river transportation. The boat is of all-steel construction and cost approximately $225,000. The hull of the ship was constructed by the American Bridge Co. at Ambridge, Pa., and the engines were built by Hoovler & Rentsler, Hamilton, O. The battery of four boilers was built by the Federal Shipping Co., Newark, N. J. The machinery, cabin and all superstructures were built by the Carnegie Steel Co. at its marine ways.

Net earnings of the Independent Pneumatic Tool Co., Chicago, for the year ended Dec. 31, 1922, were $644,419 compared with $299,675 in 1921.

Active Trading

Continues in By-Products Market—Prices Up on Sulphate of Ammonia

New York, March 20.—While demand for spot sulphate of ammonia is light, nearby supplies are scarce, with a result that prices are slightly higher on domestic business. The market may now be quoted at $3.20 to $3.25, works, as compared with the range of $3.15 to $3.20 recently. Export business is so light that it is difficult to establish a market. Indications are, however, that $3.60 to $3.65, port, in double bags, could be done, or slightly less than a few days ago.

Trading in most coal tar products, however, continues active, with sellers well sold ahead in some lines. This is particularly true in the case of naphthalene, some sellers now sold up for three months, quoting nominally at around 9½ cents for balls and 8½ cents for flakes.

Pure benzol is also unchanged at 30 cents works in tanks and 35 cents in drums; 90 per cent benzol, 27 cents in tanks and 33 cents in drums; toluol 30 cents in tanks and 35 cents in drums; solvent naphtha, 27 cents in tanks and 32 cents in drums; pure xylol, 30 cents in tanks and 35 cents in drums; and commercial xylol, 26 cents in tanks and 34 cents in drums. Phenol is unchanged around 34 cents, works.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	$0.30
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene flake	nominal
Naphthalene balls	nominal

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.20 to 3.25

Contract

Pure benzol	$0.30
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene, flake	nominal
Naphthalene balls	nominal

The heavy demand for automobile frames has greatly stimulated operations at the Parish & Bingham Co., Cleveland, according to President E. J. Kulas. March releases of orders amounted to $935,000, the largest in the company's history. During 1922 the company reports net profits of $2213 against a deficit of $356,080 in 1921.

Expect Increase

In Prices of Refractory Brick—Large Orders for Magnesite Brick Placed

Pittsburgh, March 20.—Because refractory consumers expect prices on fire clay and silica brick to be increased, efforts to place contracts for third quarter requirements are numerous. Several orders have been taken from regular customers which cannot be shipped until after April 1, a few of which incorporate such amounts as one million or two million brick each divided among two or more producers. The majority of orders placed, however, involve such amounts as 200,000 to 500,000 brick at a time. The list of recent buyers includes the United Alloy Steel Corp., the Pittsburgh Steel Foundry Co., and the Bethlehem Steel Corp. The latter as well as numerous other large interests have not completed purchases for the entire quarter. Refractory manufacturers desire to hold down bookings as much as possible or else quote prices prevailing at time of delivery. Labor is scarce and this scarcity will probably increase as attractive outside work at higher wage rates presents itself to the refractories plant workers. Because of this labor condition and the continued poor car supply, deliveries still are deferred. Prices for the time being remain substantially the same as for several weeks past although in connection with silica brick a level of at least $45 is expected to be developed within the next few days. At present silica brick is quoted at $42 while fire clay, No. 1 grade, is at $43 to $46. Makers are inclined to move slowly as regards price advances.

Several large orders for magnesite brick have been taken during the past month involving as much as 100,000 brick at a time, or for customers' 60-day requirements. One or two makers have taken business in excess of present producing capacity so that they are filled up for several weeks to come. The price of $65, seaboard base, is firm. Practically the same condition applies to chrome brick at $50, several producers being filled up for at least four weeks. Orders involving as much as 100,000 chrome brick at a time have been taken, one this past week calling for 60,000 brick at once and 40,000 to be shipped later.

Refractories

FIRE CLAY BRICK
(Per 1000 f.o.b. works)

Pennsylvania, No. 1	$43.00 to 46.00
Pennsylvania, No. 2	38.00 to 41.00
Ohio, No. 1	40.00 to 42.00
Ohio, No. 2	36.00 to 38.00
Illinois, No. 1	43.00 to 46.00
Illinois, No. 2	40.00 to 42.00
Kentucky, No. 1	40.00 to 42.00
Kentucky, No. 2	36.00 to 38.00
Missouri, No. 1	38.00 to 40.00
Missouri, high grade	48.00 to 50.00
Maryland, No. 1	45.00 to 48.00
Maryland, No. 2	35.00 to 42.00

SILICA BRICK

Pennsylvania	$42.00
Chicago	50.00
Birmingham	48.00

MAGNESITE BRICK
(Per Net Ton Seaboard Base)

9 x 4½ x 2½	$65.00

CHROME BRICK
(Per Net Ton)

9 x 4½ x 2½	$50.00

New Association

Supplants National Personnel Body Devoted To Human Factor

Nearly 200 executives, representing industrial and commercial enterprises in all parts of the country, met at a management conference at the Bankers Club of America, 120 Broadway, Wednesday, March 14, and brought into being the American Management association.

The new organization takes the place of the National Personnel association, and, according to an announcement made by the board of directors, will be "devoted exclusively to the consideration of the human factor in commerce and industry." Responsibility for the solution of problems bound up in personnel work was put squarely up to management.

Charles R. Hook, Middletown, O., vice president and general manager of the American Rolling Mill Co., declared that the leaders of American industry must carry to the rank and file of the workers a clear and simple explanation of the problems of business as they relate to financing, production and marketing.

Community activities, he asserted, have such a tremendous influence on the attitude and efficiency of the industrial worker that they must be given position in importance alongside all the other factors that count for right thinking, right attitude and efficiency inside the plant.

"Is it reasonable," he continued, "to suppose that the manager who encourages the law-violating bootlegger, will effectively secure the respect and co-operation of those whom he is endeavoring to urge to increased effort and efficiency? Is it reasonable to believe that the worker will be inclined to respect the laws that protect the property of the employer when the employer in turn considers the constitution a scrap of paper and its provisions to be treated in his case as a matter of personal opinion and personal liberty? No."

Mr. Hook, a leading figure among the manufacturers of the Middle West, said that the problem of industrial America is not just more production, but more units of production per man per day. One part of the problem, he added, deals with improved machinery to reduce the number of men needed per unit of product and the other affects individual efficiency and reward.

Another speaker was Howard Coonley, president of the Walworth Mfg. Co., who discussed "Correlation of Sales and Production." A general discussion of the problems of labor followed the speeches. The officers of the new American Management association are:

President, W. W. Kincaid, president of the Spirella Co., Niagara Falls, N. Y.; vice president, Sam A. Lewisohn, New York, vice president of the Miami Copper Co.; John A. Stevenson, vice president of the Equitable Life Assurance Society of the United States, New York; and Fred W. Tasney, vice president of the Prudential Insurance Co. of America, Newark, N. J. Directors include: Elisha Lee, vice president of the Pennsylvania Railroad Co.; E. K. Hall, vice president of the American Telephone & Telegraph Co.; C. R. Dooley, manager of personnel and training, Standard Oil Co., of New Jersey; Percy S. Straus, vice president of R. H. Macy & Co., Inc.; Arthur H. Young, manager of industrial relations, International Harvester Co.; C. S. Ching, supervisor of industrial relations, United States Rubber Co; Henry S. Dennison, president of the Dennison Mfg. Co.; Miss Louise Moore, employment service manager, Dutchess Mfg. Co.; John McLeod, assistant to the president, Carnegie Steel Co.; Dr. R. S. Quinby, service manager, Hood Rubber Co., and S. B. Bunker, advisory staff, industrial relation division, General Motors Corp.

Aluminum Industry Gains

Washington, March 20.—New aluminum produced in the United States in 1922 was valued at $13,622,000, an increase of 25 per cent over 1921, according to the federal geological survey. Imports for 1922 up to Sept. 22, when the tariff act became effective, totaled 31,482,893 pounds for all classifications, compared with 26,177,852 pounds in the corresponding period of 1921. Exports in 1922 included 2,808,964 pounds of plates, sheets, bars, strips and rods, against 499,124 pounds in 1921, and 4.548,939 pounds of manufactured articles, compared with 2,307,782 pounds in 1921.

Fittings Plants Grow

Washington, March 20.—Census bureau reports show that in 1921 the number of plants manufacturing steam fittings and hot-water and steam heating apparatus in the United States was 274, an increase of 25 over 1919 and 11 over 1914. The number of persons engaged was 37,086 in 1921, 43,864 in 1919 and 31,748 in 1914. The cost of raw materials used was $50,213,000 in 1921, $72,016,000 in 1919 and $26,921,000 in 1914, while the value of the finished product was $127,367,000 in 1921, $160,285,000 in 1919 and $63,922,000 in 1914.

Steel Corporations Gain

(*Concluded from Page* 863)

of the new 12-inch and 20-inch mills for rolling strip steel at the Gary plant of the Indiana Steel Co.; beginning of the construction of a new tube plant at the Gary Tube Co., a subsidiary of the National Tube Co.; and the progress of work on the new steel foundry at the Fairfield Works of the Tennessee Coal, Iron & Railroad Co. Regarding future expansions the report says:

"In the latter part of 1922 a program was authorized covering construction and improvement involving the expenditure of a large sum. The additions and improvement included cover to some extent new capacity both for the production and finishing of steel, but more particularly the reconstruction with modern type of old and obsolete mills and facilities, including the building of by-product coke ovens to substitute for beehive ovens, the introduction of improved and more economically operated equipments, and the development of the reserve natural resources of the company, especially of coal. At the close of the year, together with some important authorizations made shortly after Jan. 1 1923, the unexpended balance on appropriations was about $93,000,000. It is expected that approximately $65,000 000 of this will be spent in 1923."

During the year the subsidiary manufacturing railroad companies added six locomotives and 397 cars of various kinds to their equipment. This compared with 10 locomotives and 703 cars in 1921. To the fleet of oceangoing steamers there was added one cargo steamer, while in the year before 11 steamers were acquired.

The balance sheet discloses a sound financial condition, although the effects of two years of depression and inadequate earnings are reflected in some of the items. The most interesting feature in this connection is the large liquidation of marketable securities by the corporation in 1922. The total value of these securities held at the close of the year was $59,605,000. This was less than half of the $131,462,000 of one year before. In 1920 and 1919 the item stood at $150,350,000 and $159,069,000 respectively.

While the company was selling its securities it was improving its cash position. The sale of the bonds undoubtedly reflected the desire for more cash as trade activities were resumed upon a large scale. The fact that leading authorities maintained that bond prices had reached their highest levels last September, probably also was an influence in causing the corporation to sell. The cash item stands at $126,700,000. This was the highest it had been since 1919, when it was $166,726,000. In 1920 the corporation reported $116,856,000 in cash. Total cash and marketable securities amounted to $195,910,000 against $255,242,000 in 1921, $247,879,000 in 1920 and $326,664,000 in 1919.

Of considerable interest in connection with the company's earnings is the fact that in 1922 the ratio of net manufacturing income to gross receipts was 8.9 per cent. This was a slight gain over the 8.3 per cent in 1921, but it compares unfavorably with the previous years. The high mark came in 1917 with a percentage of 21 per cent. The average ratio in the three prewar years of 1911-1912 and 1913 was 16.4 per cent. High taxes, higher wages, and generally increased costs have combined to depress this ratio.

The production of ingots last year totaled 16,082,385 tons compared with 10,966,347 in 1921. This was a gain of 46.7 per cent. In 1920 the corporation turned out 19,277,960 tons of ingots. The high point for ingot production came in 1916 when a total of 20,910,589 tons was attained.

The employes of the corporation and the subsidiary companies in January, 1923 were offered the privilege of subscribing for shares of common stock at $107 per share. To the date of the writing of the annual report subscriptions have been received from 41,950 employes for a total of 100,730 shares, in comparison with subscriptions in 1922 from 34,009 employes for an aggregate of 93,645 shares.

The average number of employes in all companies during the year, and the total salaries and wages paid compared with the preceding year follows:

Employes of	1922 *Number*	1921 *Number*
Mfg. properties	150,847	133,963
Coal and coke properties	26,856	22,451
Iron ore properties	11,906	11,183
Trans. properties	21,523	20,010
Mis. properties	3,799	4,093
Total	214,931	191,700
Total salaries and wages paid	$322,678,130	$332,887,505
AVERAGE EARNINGS PER EMPLOYE PER DAY FOR YEAR:		
All employes, exclusive of general administrative and selling force	$4.78	$5.61
Total employes, including general administrative and selling force	$4.91	$5.73
AVERAGE EARNINGS PER EMPLOYE PER DAY IN DECEMBER 1922 AND 1921	$5.59	$4.60

Bring in Negro Labor

Pittsburgh, March 19.—A large local independent steel company is about to bring in several hundred negro workmen from the South and is building quarters for them near its plants.

Beehive Coke Production Declines Sharply

Washington, March 20.—The production of beehive coke in the week ended March 10 showed a sharp decline. The total output, estimated from reports of cars loaded by the principal coke carriers, and in part on reports of producers, was 366,000 net tons, against 402,000 tons in the preceding week. The decrease was principally in the Pennsylvania and West Virginia districts. The following table shows the output of beehive coke by territories:

	Week Ended March 10 1923	Week Ended March 3 1923(a)	Week Ended March 11, 1922
Pennsylvania and Ohio.	288,000	321,000	123,000
West Virginia	22,000	25,000	8,000
Alabama, Kentucky, Tennessee and Georgia	25,000	25,000	8,000
Virginia	18,000	19,000	5,000
Colorado and New Mexico	8,000	7,000	4,000
Washington and Utah	5,000	5,000	6,000
United States total	366,000	402,000	154,000
Daily average	61,000	67,000	26,000

(a) Revised from last report.

The production of by-product coke in February was 2,810,000 net tons, as compared with 3,100,000 tons in January. A slight increase was shown in the average daily output. This was at the rate of 83.5 per cent of full capacity. Of the 71 plants in existence, 62 were in operation.

Despite the short month, the total output of beehive coke in February was more than in January, being 1,482,000 net tons, as compared with 1,478,000 tons. The monthly production of beehive and by-product in net tons is shown in the following table:

	By-product	Beehive	Total(a)
1917 monthly av.	1,870,000	2,764,000	4,634,000
1918 monthly av.	2,166,000	2,540,000	4,706,000
1919 monthly av.	2,095,000	1,638,000	3,733,000
1920 monthly av.	2,565,000	1,748,000	4,313,000
1921 monthly av.	1,646,000	462,000	2,108,000
1922 monthly av.	2,374,000	669,000	3,043,000
Dec., 1922	3,063,000	1,233,000	4,296,000
Jan., 1923	3,100,000	1,478,000	4,578,000
Feb., 1923	2,810,000	1,482,000	4,292,000

(a) Excludes screenings and breeze.

Cost Reporting Case Now in Supreme Court

Washington, March 20.—The district court of appeals has approved the federal trade commission's appeal in the Claire Furnace iron, steel and coke cost-reporting case and the action now goes to the United States Supreme Court. In the Claire Furnace action are 22 independent iron, steel and coke producers who are contesting the trade commission's authority to exact production cost reports. The court of appeals of Jan. 2 sustained the district supreme court's injunction that the trade commission is now seeking to have overturned in the Supreme Court. The case comes up for appeal too late to be argued before next fall.

1922 Iron Output Increase Large

Production of 27,219,904 Gross Tons Makes Gain of 63.2 Per Cent Over 1921, the Largest Increases on Record—For First Time in History No Iron Was Made with Anthracite

PIG IRON produced in the United States during 1922 totaled 27,219,-904 gross tons, according to official figures which have just been completed by the American Iron and Steel institute. This output compares with the 16,688,126 tons in 1921, an increase of 10,531,778 tons or 63.2 per cent and the largest gain in any single year on record. The 1922 production was 12,214,893 tons below the 39,434,797 tons produced in 1916, the high record mark. During the first half of 1922 production totaled 12,-191,011 tons, and during the second half, 15,028,893 tons, or at an increase of 2,837,882 tons. Making up the 1922 total was 13,841,367 tons of basic, 7,813,203 tons of bessemer, 3,976,431 tons of foundry, 1,051,495 tons of malleable 214,210 tons of forge and 323,198 tons of all other grades. While every grade of iron showed an increase, the most important were basic which gained 78.5 per cent and malleable with an expansion of 130 per cent.

Subdividing the production for 1922, the institute reports 20,718,054 tons was made for the maker's use while the balance of 6,501,850 tons was made for sale. This represented a proportion of 76.2 per cent nonmerchant and 23.8 per cent merchant iron. Corresponding figures for 1921 were 77.7 per cent nonmerchant and 22.3 per cent merchant. During 1920, as well as 1919, the proportion was about 71 per cent nonmerchant and 29 per cent merchant.

Upon the basis of the fuel used in production, 26,995,173 tons was made with coke which includes ferroalloys made by electricity, and 224,731 tons, with charcoal. The coke iron production represented 99.2 per cent of the total. The corresponding ratios for 1921 and 1920 were 99.4 and 98.4 per cent respectively. In 1922, for the first time in the history of pig iron production, no iron was made with anthracite coal or mixed anthracite and coke. During recent years the use of anthracite has rapidly fallen.

With a total of 224,731 tons, charcoal iron production showed an increase of 130,001 tons over the 94,730 tons of 1921. Of the total produced during the year, none was made by the cold-blast method and 224,731 tons by the hot and warm-blast method. The production of ferromanganese and spiegeleisen totaled 223,558 tons, of which 150,115 tons was ferromanganese and 73,443 tons was spiegeleisen. In 1921 the ferromanganese and spiegeleisen output totaled 160,178 tons and consisted of 103,755 tons of ferromanganese and 56,423 tons of spiegeleisen.

According to the operating statistics, on June 30, 201 blast furnaces were active, while on Dec. 31, 263 out of the total of 449 were in blast. At the close of the year 58.5 per cent of the furnaces in the country were in blast. By comparison, at the end of 1921, 125 out of 450 were in operation, representing 27.8 per cent. The figure for the end of 1920 was 48 per cent. Of all the iron producing states in the country, Virginia, Maine, Massachusetts and Connecticut were the only ones to show loss. The accompanying table shows the more important figures compiled by the institute.

PRODUCTION OF COLD AND HOT AND WARM BLAST CHARCOAL PIG IRON, 1918–1922

Kinds of iron	1918	1919	1920	1921.	1922
Cold blast	4,209	2,113	1,734	350	. . . .
Hot and warm blast.	344,668	324,984	321,662	94,380	224,731
Total. Gross tons.	*348,877	327,097	323,396	94,730	224,731

*Includes small tonnage made with charcoal and coke mixed in 1918.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED

States.	Blast furnaces				Production—Gross tons. (Includes spiegeleisen ferro-mang., ferro-silicon, ferro-phosphorus, etc.)		
	In blast June 30, 1922.	Dec. 31, 1922. In.	Dec. 31, 1922. Out.	Dec. 31, 1922. Total.	First half of 1922	Second half of 1922.	Total 1922
Coke*.	191	251	165	416	12,106,225	14,888,948	26,995,173
Anthracite†.	0	0	5	5	. . . . .	. . . . .	. . . . .
Charcoal.	10	12	16	28	84,786	139,945	224,731
Total.	201	263	186	449	12,191,011	15,028,893	27,219,904

* Includes pig iron and ferro-alloys made with electricity, electricity and coke, etc.
† Includes mixed anthracite and coke pig iron.

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN 1922

Grades.	For sale.	For maker's use.	Total. Gross tons.
Basic.	1,198,106	12,643,261	13,841,367
Bessemer and low-phosphorus.	488,865	7,324,338	7,813,203
Foundry, including ferro-silicon.	3,708,600	267,831	3,976,431
Malleable.	894,837	156,658	1,051,495
Forge or mill.	65,347	148,863	214,210
Ferro-manganese.	55,002	95,113	150,115
Spiegeleisen.	43,548	29,895	73,443
All other grades.	47,545	52,095	99,640
Total. Gross tons.	6,501,850	20,718,054	27,219,904

PRODUCTION OF PIG IRON BY GRADES, 1907–1922

Years	Basic.	Bessemer.	Foundry.	Malleable.	Forge.	All other.	Total. Gross tons.
1907.	5,375,219	13,231,620	3,151,209	920,290	683,167	419,856	25,781,361
1908.	4,010,144	7,216,976	3,637,622	414,957	457,164	199,155	15,936,018
1909.	8,250,225	10,557,370	5,322,415	658,048	726,624	281,789	25,795,471
1910.	9,084,608	11,245,642	5,260,447	843,123	564,157	305,590	27,303,567
1911.	8,520,020	9,409,303	4,468,940	612,533	408,841	229,910	23,649,547
1912.	11,417,886	11,664,015	5,073,573	825,643	469,183	276,337	29,726,937
1913	12,536,693	11,590,113	5,220,343	993,736	324,407	300,860	30,966,152
1914.	9,670,687	7,859,127	4,533,254	671,771	361,651	235,754	23,332,244
1915.	13,093,214	10,523,306	4,843,899	829,921	316,214	309,659	29,916,213
1916.	17,684,087	14,422,457	5,553,644	921,486	348,344	504,779	39,434,797
1917.	17,671,662	13,714,732	5,328,258	1,015,579	345,707	545,278	38,621,216
1918.	18,646,174	13,024,966	5,145,260	1,117,914	393,932	726,398	39,054,644
1919.	14,494,131	9,975,934	4,916,758	1,009,049	271,286	348,206	31,015,364
1920.	16,737,722	12,062,084	5,957,782	1,310,951	318,048	539,400	36,925,987
1921.	7,753,071	5,595,215	2,568,136	457,340	112,748	201,616	16,688,126
1922.	13,841,367	7,813,203	3,976,431	1,051,495	214,210	323,198	27,219,904

Iron and Steel Exports Decline

Total Tonnage Shipped Abroad in January Dropped Below That of Preceding Month and January 1922—Some Products Register an Increase—Castings and Forgings Exports Also Show a Falling Off

EXPORTS of iron and steel in January totaled 134,411 tons, according to figures just issued by the United States department of commerce, bureau of foreign and domestic commerce. This is a decline of 19,915 tons as compared with exports in December, which totaled 154,326 gross tons, and a drop of 31,551 gross tons compared with exports in January, 1922, which totaled 165,962 gross tons.

While total exports fell some products registered an increase during the month, as compared with the same period one year ago. These include pig iron, January exports of which totaled 2482 tons compared with 1048 tons in January a year ago but a decline as compared with 3136 tons exported in December. Semifinished steel with 10,563 tons registered a gain compared with 4651 tons in January, 1922, and 8449 tons in December. Other products to show an increase compared with January, 1922, were iron and steel bars, plates, plain structural shapes, railroad spikes, railroad bolts, nuts and rivets, boiler tubes, casing and oil line pipe, welded galvanized pipe, cast iron pipe, cast iron pipe fittings, plain wire, barbed wire, woven wire fencing, wire cloth and screening, wire rope and cable and bolts, nuts and rivets.

In addition to semifinished steel, these exports which increased during the month compared with December included wire rods, galvanized sheets, black steel sheets, black iron sheets, structural forms other than plain and fabricated, rails under 50 pounds, cast iron pipe and ferromanganese and spiegeleisen. Compared with December figures losses were recorded by January in pig iron, scrap, semifinished steel, iron and steel bars, plates, hoops, bands and scroll, tin and terne plate, plain and fabricated structural shapes, ship and tank plates, rails over 50 pounds, rail joints, etc., boiler tubes, pipe, and pipe fittings, wire, bolts, nuts, rivets, ferrosilicon, horseshoes, and all manufacturers of iron and steel which are not specifically identified.

Castings and forgings exports in January totaled 1808 gross tons. This is a decline of 1173 tons against the 2981 tons in January, 1922. It also is a decline of 1378 gross tons as compared with exports of 3186 tons in December. Exports of ferrosilicon totaled 33 tons in January compared with 53 tons in the corresponding month of 1922 and 196 tons in December. Ferromanganese and spiegeleisen exported during the month totaled 46 tons against 121 tons in January, 1922, and 43 tons in December.

IMPORTS AND EXPORTS
Gross Tons

	1923		1922	
	Imports	Exports	Imports	Exports
Jan.	.....	134,411	13,404	165,962
Feb.	.....	.....	11,535	133,333
March	.....	.....	12,774	206,474
April	.....	.....	18,720	197,562
May	.....	.....	23,098	229,616
June	.....	.....	39,154	216,298
July	.....	.....	62,426	157,027
Aug.	.....	.....	49,054	144,264
Sept.	.....	.....	76,393	128,370
Oct.	.....	.....	184,202	131,542
Nov.	.....	.....	152,250	124,004
Dec.	.....	.....	.....	154,087
Total	.....	.....	643,010	1,988,539

Year	Imports	Exports
1921	135,825	2,150,276
1920	421,274	4,934,087
1919	322,264	4,397,295
1918	169,110	5,338,019
1917	330,201	6,465,053
1916	328,965	6,110,732
1915	282,396	3,532,564
1914	289,775	1,549,554
1913	317,260	2,745,635

IRON AND STEEL EXPORTS
Gross Tons

	January 1923	January 1922
Pig iron	2,482	1,048
Scrap	1,663	4,585
*Semifinished steel	10,563	4,651
Iron bars	3,300	
Steel bars	11,391	9,423
Alloy steel bars	62	
Wire rods	1,696	4,075
Boiler plate	229	758
Other plates	7,619	2,043
Galvanized sheets	7,600	16,059
Black sheets, steel	6,509	25,170
Black sheets, iron	1,003	1,985
Cold-rolled strips	584	234
Hoops, bands and scroll	2,092	2,235
Tin and terne plate	5,894	12,085
Structural shapes, plain	10,943	2,197
Structural shapes, fabricated	1,312	1,726
Ship and tank plates, punched or shaped	324	335
Other structural forms	3,256	3,881
Rails over 50 pounds	13,578	26,306
Rails under 50 pounds	3,005	3,364
Rail joints, etc	1,180	1,190
Switches, frogs, etc	642	801
Railroad spikes	594	450
Railroad bolts, nuts, etc	200	138
Boiler tubes	1,166	597
Casing and oil line pipe	4,447	2,890
Welded black pipe	4,453	7,046
Welded galvanized pipe	2,059	1,069
Malleable iron pipe fittings	474	792
Cast iron pipe	1,655	820
Cast iron pipe fittings	997	415
Plain wire	2,575	2,113
Galvanized wire	2,596	6,670
Barbed wire	4,722	2,098
Woven wire fencing	284	115
Wire cloth and screening	167	99
Wire rope and cable	344	305
Insulated wire and cable	188	230
Other wire	1,051	771
Cut nails	127	333
Wire nails	2,132	6,575
Horseshoe nails	57	50
Other nails	318	218
Bolts, nuts, rivets, etc	1,507	1,032
Ferrosilicon	33	53
Ferromanganese and spiegeleisen	46	121
Horseshoes	77	62
Other iron and steel	5,215	6,754
Total	134,411	165,962

*Includes ingots, blooms, billets, slabs, sheet and tin plate bars and skelp.

FERROALLOY EXPORTS
Gross Tons

	January 1923	January 1922
Ferrosilicon	33	53
Ferromanganese and spiegeleisen	46	121
Tungsten, manganese and other alloys	1	..
Ferrotungsten, tungsten metal and wire	1	..
Ferrovanadium	5	3
Other ferroalloys	320	1

CASTINGS AND FORGINGS EXPORTS
Gross Tons

	January 1923	January 1922
Iron castings	843	449
Car wheels and axles	634	2,049
Steel castings	73	363
Iron and steel forgings	258	120
Total	1,808	2,981

Erie To Reroll Scrap

Approximately $35,000 will be expended by the Erie railroad for the construction of a reclaiming rolling mill at Kent, O. The mill will be used for rerolling scrap rods, bars and other scrap material. A survey has been made for a siding and the building which will house the mill.

Cutler Plant Operating

Operations have been started at the plant of the Cutler Steel Co., New Cumberland, W. Va. The first heat from the newly installed electric furnace was poured several days ago. The old plant of the National Steel Castings Co. has been remodeled by the Cutler company which has headquarters in Pittsburgh. Frank B. Foster is in charge of the plant.

Organize Sales Agency

L. S. Kerchnes and R. M. Marshall, formerly affiliated with the Pittsburgh and Philadelphia offices, respectively, of the American Manganese Mfg. Co., have formed a partnership under the firm name of Kerchner & Marshall. Offices are located at 647-648 Oliver building, Pittsburgh. They will deal in ferroalloys, pig iron, coal, coke, and sand. The following companies will be represented: The American Manganese Mfg. Co., David Halstead, receiver; Dunbar Coal & Coke Co., and the Gellert Engineering Co., Baltimore, Md., ingot molds, etc.

Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields

CLIFFORD E. PIERCE, who has become president of the Betz-Pierce Co., Cleveland, iron and steel jobber, having purchased the interest of A. B. Betz, formerly was vice president and treasurer of the company. Mr. Pierce and Mr. Betz had been actively associated in business for many years prior to the organization of the Betz-Pierce Co. in 1911, both being connected with the Bassett-Presley Co., Cleveland, iron and steel jobber. Mr. Pierce is well known in Cleveland industrial and financial circles. He is first vice president of the Security Savings & Loan Co. and in addition to being an officer of the Domestic Electric Co. is actively interested in several other manufacturing companies. For a number of years he has been prominent in the activities of the Rotary club of Cleveland and in 1921-22 served that organization as president. At the present time he is an active member and is especially interested in welfare work. He also is active in the affairs of the National Hardware association, metals branch, being a member of the executive committee. Sometime ago Mr. Pierce was selected by the Cleveland bankers to serve the city in the capacity of finance director in the mayor's cabinet. However, due to his many business interests, he was forced to decline the honor. Thomas L. Philpott, who has been secretary of the Betz-Pierce Co. has been made treasurer, and R. H. Southworth, who has been in charge of sales, has been elected secretary.

John W. Harrington, treasurer of the Harrington & Richardson Arms Co., Worcester, Mass., has returned from an European trip.

P. K. Reed has been appointed manager of the Chicago office of R. H. Beaumont Co., Philadelphia. His headquarters are at 760 Monadnock block, Chicago.

W. O. Little has been placed in charge of the Cleveland sales office at 2104 East Superior avenue, of the Gibb Instrument Co., Bay City, Mich., which was opened recently.

James A. Irvine has resigned as sales engineer of textile machinery for the Rodney Hunt Machine Co., Orange, Mass., to accept a position with Cheney Bros., South Manchester, Conn.

A. H. Talbot, formerly secretary and treasurer of J. T. Gardner, Inc., Chicago, has opened offices at 237 Railway Exchange building, Chicago, to deal in railway cars, rails, etc.

R. W. Baker has been named New York district manager for the Howell Electric Motors Co., Howell, Mich.

CLIFFORD E. PIERCE

His headquarters are at 17 East Forty-second street, New York city.

Dana E. Williams has been elected president and general manager of the Semi-Steel Foundry Co., Barberton, to succeed Herman Peterson who died recently from injuries received in an accident.

H. L. Wright, a member of the engineering staff of the National X-Ray Reflector Co., Chicago, is in charge of the company's office recently opened at room 408, 750 Prospect avenue, Cleveland.

W. H. White, formerly president of B. M. Jones & Co., Inc., steel importer, has been appointed manager of the new district sales office of the Atlas Steel Corp., Dunkirk, N. Y., opened in the Hanna building, Cleveland.

Clifford F. Messinger, general sales manager of the Chain Belt Co., Milwaukee, has been elected second vice president. He has served as a director for several years. He is a member of the board of the Interstate Drop Forge Co., Milwaukee.

D. A. Lyon, chief metallurgist of the bureau of mines, has been made assistant director of the leasing branch set up within the bureau, to take charge of research work. Growth of leasing operations on public lands necessitated the creation of the branch.

Frank A. Scott, vice president of the Warner & Swasey Co., Cleveland, has been named vice president of the Cleveland Engineering society to fill the unexpired term of C. M. Osborn. Mr. Scott also is a director of the White Sewing Machine Co., Cleveland, and the Cleveland Trust Co.

Percival Farquhar, 120 Broadway, New York, is scheduled to sail March 14 on the steamship FRANCE for Plymouth, England. He will be abroad three to four months on business connected with the development of the Itabira iron ore deposits in Minas Geraes, Brazil.

J. C. Wicks, formerly district sales manager at Cleveland for the Brier Hill Steel Co., Youngstown, O., with R. G. MacKenzie, and E. M. Updegraff, both of whom were connected with the Brier Hill company now are members of a partnership known as J. C. Wicks & Co., at Cleveland, to deal in iron and steel products, etc.

S. R. Rectanus, who has been director of the personal service division of the American Rolling Mill Co., Middletown, O., has been appointed assistant manager of the Ashland division of the company at Ashland, Ky. He is a graduate of Purdue university and has been with the company since 1909. A. K. Lewis, formerly director of safety and labor, succeeds Mr. Rectanus.

J. C. Jones has been appointed manager of the central station division of the Los Angeles office of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Other changes in the

office include the appointment of G. B. Kirker as manager of the transportation division, J. H. Jamison as manager of the merchandising division and R. A. Hopkins as manager of the engineering division.

R. P. Snelling, treasurer of the Saco-Lowell Shops, Boston, was made a vice president of the company at its recent annual meeting. P. D. Howe, who was assistant treasurer was named treasurer and Frank J. Hale, who was general agent, also was named vice president. He has been succeeded by Robert F. Herrick Jr., who was assistant general agent. The new vice presidents have been actively associated with the business for 40 years.

William S. Rogers, who has been elected president of the Rogers-Brown Iron Co., Buffalo, is the son of William A. Rogers, now serving as chairman of the board of directors. He was born June 30, 1888, in Cincinnati, attended Nichols

WILLIAM S. ROGERS

Preparatory school at Buffalo, later the Hill school at Pottstown, Pa., and graduated from Yale university in 1910. After leaving college, Mr. Rogers traveled in Europe and later entered the offices of W. J. Gunnell, public accountant and auditor, where he studied business procedure. In May, 1911 he was employed in the laboratory of the Tonawanda Iron & Steel Co. at that time a subsidiary of the Rogers company. Later in company with his father, he attended the international Iron and Steel meeting at Brussels, Belgium. On his return he entered the offices of Rogers, Brown & Co., as junior clerk, remaining there nine months and leaving to put in three years as a Rogers, Brown & Co. salesman. In July, 1915 he was made assistant to the president of the Rogers-Brown Iron Co., and held that title until July 1, 1919. During this time and from June, 1916 until March, 1917, he was on the Mexican border with the First New York cavalry and from then on he was successively in the officers' training camp, and instructor in the field artillery school of fire. He was discharged a captain in December, 1918, and on Jan. 2, 1919, was made a partner in Rogers, Brown & Co., and secretary of the Rogers-Brown Iron Co. In 1922 he was made third vice president as well as secretary of the latter organization which position he held until his recent promotion.

Thomas E. Doyle has been elected a member of the Pittsburg board of public education. He succeeds the late Andrew S. McSwigen. Mr. Doyle for more than 30 years has been actively connected with the Dravo-Doyle Co., of which he is president and a director. His other business connections are the Enterprise Machine Co., the Dravo Contracting Co., the Poland Coal & Coke Co., and the Ocean Coal Co., being a director of each.

H. A. Berg, assistant general superintendent of the Cambria Steel Co., has resigned that position to become general manager of the Marting Iron & Steel Co., Ironton, O. Prior to November, 1920, Mr. Berg was general blast furnace superintendent of the Midvale Steel & Ordnance Co., which position he held since April, 1919.

E. H. Worth has been elected president of the Worth Steel Co., Claymont, Del., succeeding his father, the late W. P. Worth. Mr. Worth had been vice president and treasurer of the company. W. A. Worth has been elected vice president and treasurer and G. D. Spackman, secretary. Paul M. King and Thomas Y. Moore have been elected to the board of directors.

Maxwell Spiro, formerly eastern manager of the Briggs & Turivas Co., Chicago, is now in the same line of business for himself at 50 Church street, New York, under the name of Maxwell Spiro & Co., handling new and scrap metals.

Clayton Mark, chairman of the board of directors of the Steel & Tube Co. of America, Chicago, has been elected president of the Civic federation of Chicago to fill the vacancy caused through the resignation of Henry G. Zander. At one time Mr. Mark was president of the Chicago board of education, and was chairman of the Commercial club's educational committee which made an extensive study of vocational education in Europe and the United States. He has been a member of the executive committee of the Civic federation for a number of years.

Frank Kilmer, treasurer of the Wickwire Spencer Steel Corp., Worcester, Mass., has severed his connection with the corporation.

John F. McNamara of the Fitchburg Steam Engine Co., Fitchburg, Mass., has been elected president of the Executive club, composed of members of the Worcester, Mass., branch of the National Metal Trades association and the Employers' association of Central Massachusetts.

Joseph F. Owens, sales manager of the Lapointe Machine Tool Co., Hudson, Mass., sailed from New York, March 6 on an extended tour through England, France and Belgium.

R. B. Tripp has been appointed sales manager of the Ohio Forge Co., Cleveland, being promoted from the position of purchasing agent, which he has held for the past six years. Prior to joining the Ohio Forge Co., Mr. Tripp was advertising manager of the United Hardware Co., New Orleans. He has been an active member of the Cleveland Purchasing Agents' association, serving one year as treasurer and two as a director of that organization.

R. B. TRIPP

Howard Coonley, president of the Walworth Mfg. Co., Boston, will be tendered a dinner at the Boston Tavern, March 26, by the employes, in honor of his tenth anniversary as head of the company.

Prof. Lester P. Breckenridge, chairman of the department of mechanical engineering at Yale university, New Haven, Conn., will retire at the end of the college year in June.

Obituaries

EDWARD H. DEAN, president of the Dean Bros. Steam Pump Works, Indianapolis, died March 11 at his home from kidney trouble. Although he was 83 years old, his death was unexpected as he appeared to be enjoying excellent health a few hours before he was stricken. He was born in Deansboro, N. Y., in 1843, but later his family moved to New York city. He attended the public schools in Brooklyn, and later learned the machinists' trade. During the Civil war he served in the navy as an engineer. Following the close of the war Mr. Dean entered the foundry and machine business at Rome, N. Y. In 1870 the business was removed to Indianapolis, and for more than 30 years he has been president of the company.

James McGee, who was connected with the Dempsey Brass Foundry, Lynn, Mass., died March 10.

George Walbridge Miller, formerly head of the Buffalo Car Mfg. Co., and the Niagara Car Wheel Co., Buffalo, died at New York March 12. He was 82 years old.

Franklin W. Pitcher, president and founder of the Franklin Steel Co., Joliet, Ill., died at his home in Easthampton, Mass., March 11. He was 90 years old.

Charles F. Cuno, president and founder of the Cuno Engineering Corp., Meriden, Conn., maker of electrical automobile specialties, died in Miami, Fla., March 14, where he had gone for his health. He was 60 years old. His son, Charles H. Cuno, is secretary and treasurer of the corporation.

Edward W. Corey, who retired two years ago as president of E. Corey & Co., Portland, Me., iron and steel dealer, died unexpectedly at his home in that city, March 15, aged 69 years. He succeeded his father as president in 1905. He had been identified with the business nearly 50 years.

Col. Percy S. Sowers, who formerly was prominently identified with the steel enterprises at Canton, O., and other cities, died recently at Salt Lake City. He was one of the organizers of the Canton Malleable Iron Co. and was a pioneer in the manufacture of reaping and harvesting machinery. He was an organizer of the first Canton, O. steel plant, later operated as Bolton, Myers & Co., and also was an organizer of the Canton Steel Railway Co.

George A. Dean, well known in Wheeling, W. Va. iron and steel circles, died recently at his home in Steubenville, O. He was 72 years old. At one time he was secretary and general manager of the Junction Co., and manager of the Jefferson Iron Co., now the LaBelle plant of the Wheeling Steel Corp.

Howard M. Benedict, secretary of the Indianapolis Pressed Steel Co., Indianapolis, died in an Indianapolis hospital recently following an operation for appendicitis, aged 29. He finished an engineering course at Purdue university and was an honor man at that institution. During the war, he served in the aviation corps. He is survived by the widow and a three-year old daughter.

Fred Grotenrath, president of the American Machinery Co., Milwaukee, died March 15 after a brief illness. He was 77 years old. He organized the American Machinery Co. in 1900 and retired about two years ago, turning the active management over to his sons, George, vice president and general manager; Fred J., secretary and treasurer; and Edwin W., assistant manager.

Fred H. Goff, Cleveland banker and philanthropist, died in a Cleveland hospital March 14, following an operation several days before for appendicitis. He was 64 years old. While a banker of national reputation, Mr. Goff was actively interested in many industrial enterprises and for a number of years was a director of the White Sewing Machine Co., Cleveland, the National Acme Mfg. Co., Cleveland, the American Zinc, Lead & Smelting Co., New York, the Sherwin-Williams Co., Cleveland, and other companies as well as various railroads.

Crannell Morgan, vice president and general manager of the Hardware & Supply Co., Akron, O., and a leader in Akron civic and business activities, died at his home March 17, following a week's illness from influenza. He was 53 years old and a native of Ohio. Prior to going to Akron in 1893 he was connected with the W. Bingham Co., Cleveland, and his first business venture in Akron was the organization of the Morgan Bundle Co. About 18 years ago he helped to organize the Hardware & Supply Co. During 1917 Mr. Morgan was president of the Akron chamber of commerce and during the past few years has served on practically every committee in the chamber as well as being a director of the organization. He was president of the National Supply & Machinery Dealers association during 1920 and has taken an active interest in affairs of this organization. Mr. Morgan was interested in a number of industrial and business enterprises and he was a director and treasurer of the Wise Furnace Co. of Akron.

Rolled Zinc Gains in 1922

Washington, March 20.—The 1922 output of rolled zinc in the United States was 76 per cent greater than in 1921, according to the federal geological survey's compilation, which gives the following detailed information concerning the industry:

	1921	1922
Sheet zinc not over 1/10-inch thick:		
Quantity .....pounds	28,580,904	50,193,463
Value	$2,844,406	$4,043,656
Aver. price per pound.	$0.100	$0.081
Boiler plate and sheets over 1/10-inch thick:		
Quantity .....pounds	2,545,755	2,229,877
Value	$192,987	$155,074
Aver. price per pound.	$0.076	$0.070
Strip and ribbon zinc:		
Quantity .....pounds.	29,673,527	54,585,375
Value	$2,902,815	$4,346,347
Aver. price per pound.	$0.098	$0.080
Total rolled zinc, pounds	60,800,186	107,008,715
Total value	$5,940,208	$8,545,077
Average price per pound.	$0.098	$0.080
Sheet zinc imported:		
Quantity .....pounds	13,375,245*	830,835
Value	$496,445	$59,023
Declared value per pound at foreign mills	$0.037	$0.071
Rolled zinc exported:		
Quantity .....pounds	3,631,647	6,433,089
Value	$425,618	$574,491
Aver. price per pound.	$0.117	$0.089
Available for consumption .....pounds	70,543,784	101,406,461

*Jan. 1-Sept. 21, inclusive; no imports in October.

Officers Are Elected

At the annual meeting of the Rogers-Brown Iron Co., Buffalo, held March 13, the new office of chairman of the board was created and the following officers elected: Chairman of the board, William A. Rogers; president, William S. Rogers; vice presidents, Hugh Kennedy and C. R. Holzworth; treasurer, David G. Williams, and secretary, Charles H. Byron. The new president is the son of William A. Rogers, and Mr. Holzworth comes to the company from Granite City, Ill., where he has been general manager of the blast furnace and coke operations of the St. Louis Coke & Chemical Co.

Reveals Great Industrial Growth

National Conference Board's Analysis of Census of Manufactures Shows Value of American Products Increased 6000 Per Cent, Wage Earners in Manufacturing 1000 Per Cent in Two Generations—Remarkable Changes Traced

IN THE span of little more than two generations the United States has assumed the leading position among all nations in the volume and variety of its manufactured production, in the number of wage earners engaged in manufacturing, in the power applied to manufacturing processes and in the value of manufactured products. This statement is emphasized by the National Industrial Conference board, New York, in an analysis of the census of manufactures of 1919 and preceding censuses. The record shows that the United States' position as the world's greatest industrial nation has been established in large part within five years, from 1914 to 1919. The board's summary of its analysis is as follows:

"From 1849 to 1919 the total value of products manufactured in the United States rose from $1,091,000,000 to nearly $62,500,000,000, and the number of wage earners employed in manufacturing from 957,059 to 9,096,372. In the first 20 years of this century the personnel of manufacturing industries more than doubled, while the total value of manufactured products in 1919 was approximately five and one-half times the total in 1899.

"An increasing proportion of the working population has been drawn into manufacturing. Of each thousand persons engaged in gainful occupations in 1899, about 182 were employed in manufacturing industries. The corresponding figure 20 years later was 260, representing an increase of about 43 per cent. In some states the percentage gain in the number of persons employed in manufacturing relative to the total population gainfully occupied was much larger—in Michigan nearly 90 per cent, in Ohio nearly 70 per cent, Indiana, 69 per cent, Washington and Missouri 65 per cent.

Industry Moves Westward

"This indicates how the centers of industrial activity have moved slowly but surely westward, pushing back the agricultural frontier and stimulating the growth of cities.

"This development has taken place, however, without increasing the proportion of women and children in industry. The entrance of women into industry has no more than kept pace with the industrial growth, while the proportion of workers under 16 years of age declined almost 60 per cent in the period from 1899 to 1919.

"The growth in the personnel of manufacturing industry and the effect of increased production on the standard of living are reflected in the increasing expenditures for wages and service, accompanied by a rapidly mounting average cost of service to the employer. The average cost of labor in manufacturing industries rose from $20.71 per month in 1849 to $96.50 in 1919, an increase of 368 per cent. The total wage cost in manufacturing industries increased 158 per cent from 1914 to 1919 alone. At the same time there has taken place a steady decline in prevailing hours of work. From 1909 to 1919 the number of wage earners in manufacturing establishments operating 48 hours or less per week increased about 750 per cent. In 1919 about one-eighth of the total number of wage earners in manufacturing were employed in establishments operating 44 hours or less per week, nearly one-half in establishments where the work-week was 48 hours or less and nearly three-fourths in establishments where it did not exceed 54 hours.

"Although wages represent the largest item of expense in industry, probably the most remarkable indication of the increasing importance of industry in the social economy is seen in the growing tax burden borne by manufacturing industries in the census periods. Tax expenditures outstripped all other items of expenditure in relative gain, with an increase of 371 per cent from 1914 to 1919, while the ratio of taxes to total expenditures more than doubled.

"No less significant than these changing external relations of manufacturing industry with American life are the changes that have taken place within the structure and processes of industry itself. The increasing importance of management in the complex industrial structure is reflected in the remarkable growth of overhead personnel, in the tendency toward increasing the large industrial units and in the steadily growing movement toward corporate ownership. The manufacturing industries of the country employed in 1919 only 29 per cent more wage earners than in 1914, while during the same period the number of salaried officers of corporations increased 43 per cent, superintendents and managers 92 per cent and clerical and other salaried employes 43 per cent.

Proportion of Workers Changes

"There has also been a remarkable increase in the past 20 years in the proportion of workers employed in large establishments. Although establishments employing over 1000 wage earners were less than one-third of 1 per cent of the total number of all establishments, in 1919 they employed over 26 per cent of the total number of wage earners. Despite this tendency toward larger industrial units, the great majority of the manufacturing establishments of the country employ a relatively small number of wage earners. Nearly one-half of the establishments employ from one to five wage earners each and more than two-thirds from one to 20. While in 1904 the proportion of wage earners in establishments owned by corporations was slightly less than 71 per cent of the total number in manufacturing establishments, in 1919 the proportion had risen to over 86 per cent of the total.

"These changes have gone along with new developments in manufacturing processes which are directly indicated by the increasing importance of mechanical power and the development and use of new types of power and fuel such as electricity and oil in the last two decades. The total horsepower of the various types of power in manufacturing establishments increased from about 2,350,000 in 1869 to nearly 30,000,000 in 1919, 50 years later. The ratio of mechanical power to man-power has also increased to a marked degree. From 1899 to 1919 the total power used nearly trebled, while the number of wage earners increased less than two-thirds. In the last decade the total horsepower of electrical motors in manufacturing plants rose nearly 239 per cent. A marked increase in the use of oil has taken place in the last decade, the quantity of this fuel consumed in manufacturing rising from 34,000,000 barrels in 1909 to 92,000,000 barrels in 1919 or approximately 168 per cent.

"As a result of these developments and of the rising price level due to worldwide economic influences, there has taken place an increase in the production and value of industrial products in many industries far out of proportion to the increases in the man power and mechanical power used. This is especially marked in the automobile, phonograph, rubber and petroleum industries, while in the woolen, beet sugar, boot and shoe, brick and clay products, fertilizer and glass industries, production did not keep pace with increases in wage earners and power employed."

Buys Partner's Interest in Jobbing Business

Announcement has been made to the effect that Clifford E. Pierce, who has been vice president and treasurer of the Betz-Pierce Co., Cleveland, iron and steel jobber, has purchased the interest of A. B. Betz, who is retiring to devote his time to personal interests. Mr. Betz has been president of the company and will be succeeded in this position by Mr. Pierce. The name of the company, for the present at least, will remain unchanged. The company was formed in 1911 for the general jobbing of iron and steel products and a warehouse was established at 2230-2240 East Ninth street, Cleveland. Prior to that time Mr. Pierce and Mr. Betz were associated for many years having been connected with the Bassett-Presley Co., Cleveland, iron and steel jobber. Other changes in the Betz company include the election of Thomas L. Philpott, who has been secretary, to the position of treasurer, and R. H. Southworth, who has been in charge of sales, to the position of secretary.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

THE Robert Berner Structural Steel Co., a newly formed organization in Indianapolis, has taken over the holding of the Haywood Foundry Co. on South Harding street at Oliver avenue. It will begin work immediately upon a number of large contracts for structural steel. The company is headed by Mr. Berner, who was formerly of Hetherington & Berner. It is a closed corporation with Clifford J. Williams, of the Union Trust Co., Arthur Gage and Henry Dickson, all of Indianapolis, holding the common stock. Approximately $40,000 will be spent in enlarging and remodeling the plant.

* * *

PISTON pins and automobile parts will be manufactured by the Elgin Piston Pin Co., Elgin, Ill., which recently was organized. The company has leased a plant building containing 6250 square feet of floor space. Officers of the firm are: President, F. E. Johnson; secretary, H. A. Fletcher; and treasurer, George J. Kirk.

* * *

OFFICERS were elected at the recent annual meeting of the Superior Steel Corp., Pittsburgh. They are: Chairman of the board, James H. Hammond; president, R. Edson Emery; treasurer, Charles H. Foster; secretary, C. D. Claney; assistant secretary and assistant treasurer, D. M. Liddell.

* * *

RECENTLY incorporated with $50,000 capital stock, the Quincy Compressor & Pump Co., 217 Main street, Quincy, Ill., will manufacture vacuum pumps and air and water-cooled compressors. A completely equipped plant has been leased. Officers are: President, H. C. Yates; vice president, C. H. Irwin and secretary-treasurer, Mac Irwin.

* * *

THE Heggie Simplex Boiler Co., 1708 Collins street, Joliet, Ill., which was recently incorporated with $150,000 capital stock, combines the management of James G. Heggie & Sons, Inc., Joliet, with that of Simplex Boilers. Officers are: President, James G. Heggie; vice president and general manager, John F. Heggie and secretary and treasurer, C. A. Russell.

* * *

OPERATIONS are being started by the Universal Brass Works of Indiana, 139 South East street, Indianapolis, a new industry. Most of the machinery is in position. The company will manufacture turret nozzles for fire fighting equipment; hydraulic mining equipment and other products. C. H. Meyer, is president; Mrs. L. A. Meyers, vice president, and E. S. Harter, secretary-treasurer.

* * *

PLANS have been announced for the organization of the Dalton Malleable Castings Co., at Warsaw, Ind. The company will have a capital stock of $350,000. J. Dalton of Warsaw will be president and T. C. Frazer, of the same city, will be secretary. The plant will located in East Warsaw and it is expected operations will be started sometime in May.

* * *

THE Victory Bearings Co., Indianapolis, has been bought by the McQuay-Norris Mfg. Co., St. Louis. Articles of incorporation show a capitalization of $150,000. The output of the plant will be enlarged. R. F. Crom, Indianapolis, will be manager and secretary. This company a year ago bought the property of the Wainwright Engineering Corp. of Connersville and H. A. Wainwright, general manager of that plant is one of the incorporators of the reorganized Indianapolis company.

* * *

TO MINE and market an aluminum ore to be used as a pigment, the Aluminum Pigment & Products Co., Inc., Bowmanstown, Pa., recently was incorporated. The pigment, which the company will make, contains 3 per cent lime, 3 per cent magnesia, 7 per cent iron and 86 to 87 per cent alumina and silica of alumina. The company has contracted for the erection of several plant buildings and construction of them started March 12. Steam power will be used to crush and pulverize the ore. The company has contracted for a Fuller-Lehigh air separator, a Dodge crusher and boilers and engines. I. J. Stroup is president and treasurer of the company and William H. Trexler, secretary. The company has not yet established an office and mail should be sent to Mr. Trexler at Leighton, Pa. Eastern representative of the company is L. H. Butcher & Co., 235 Front street, New York City.

* * *

GENERAL manufacturing, including the building of special machinery, tools, dies, jigs and fixtures, will be engaged in by the Standard Machine & Tool Corp., Moline, Ill., which recently was incorporated with a capital stock of $10,000. The company also will manufacture copper balls for the plumbing trade and do all kinds of metal stamping. Officers are: President, C. A. Cook; vice president and treasurer, E. J. Aspengren and secretary, G. B. Gaylord.

* * *

PRINTERS' machinery, such as sterotype casting boxes, mitre saws, mat making equipment, etc., is manufactured by the H. L. Fisher Mfg. Co., Inc., 4100 Ravenswood avenue, Chicago, which recently was incorporated to take over the co-partnership of Harvey L. Fisher and Milan H. Fisher. The company has a capital stock of 500 shares without par value. Enlargement of the company's plant and facilities are not contemplated at this time. Officers are: President, Harvey L. Fisher; vice president and treasurer, Milan H. Fisher; and secretary, Melville M. Guthrie.

* * *

THE Furnace Fan Corp., Dowagiac, Mich., which purchased the plant and assets of the Dowagiac Drill Works, which it has equipped to build fans for warm air furnaces, held its first annual stockholders meeting recently. Officers elected were: President and general manager, Nathaniel B. Wales; vice president and sales manager, H. M. Snow; secretary, James F. Firestone; treasurer, Sidney P. Mosher and chairman of the board of directors, Fred H. Baker. The directors are George Howes, Elmer A. Case, John Kauffman, John H. Schmitt, F. E. Tarrant, Dr. S. L. Loupee and Giles Morton.

Machinery Demand Is Expanding

Despite Higher Tool Prices Order Volume Continues To Grow—Canadian National Buys $500,000 of Equipment—Numerous Inquiries from the Railroads Are Current —General Industrial Demand Is Steadily Improving

ADVANCING machine tool prices do not appear to have interferred to any extent with the improvement in equipment demand which has been noted for some time past On the contrary, demand appears to be increasing and as a result machine tool shops, on the whole are operating at a greater rate than at any time since 1920.

Some large business has been placed recently but most of the orders call for single machines. However, the volume of this single tool business is large. Such purchases it is thought, represent imperative needs and are for replacement purposes. Probably the largest business done in the past few weeks was that placed by the Canadian National railways for approximately $500.000 of equipment. Most of this business went to American tool builders. Other sizable buyers of the past few days are the Baldwin Locomotive Works, the General Electric Co., the Richmond, Fredericksburg & Potomac railroad.

Prospective demand is enormous. This is especially true of the railroads. Inquiries are current from the Rock Island, the Chicago, Burlington & Quincy, the Chesapeake & Ohio, the New York Central, the Lackawanna, the New York, Ontario & Western railroads and several others. Prospective general industrial demand is expanding steadily.

Used machinery still is in heavy demand but due to the fact good secondhand tools are scarce many orders are being turned into new tool channels. However, equipment auctions are well attended and high prices are paid for good secondhand tools. New machine tool prices are stronger and the tendency to advance higher is noted, as production costs increase.

Prospective Railroad Tool Orders Still Large

NEW YORK, March 20.—Although there are few outstanding orders, demand for machine tools continues to improve. A sizable buyer of the past week is the Baldwin Locomotive Works, Philadelphia, which closed on seven planers, 48 and 60 inches. The General Electric Co. has closed on two turret lathes for its Schenectady, N. Y., plant, and has issued inquiries for four more. The Standard Oil Co. of New York has closed on two 6-foot radial drills, and the Richmond, Fredericksburg & Potomac has covered on a list of about eight machines. The Ideal Electric & Mfg. Co., Cleveland, has purchased a 100-inch boring mill from an eastern builder.

Some promising railroad business is in prospect. The Chesapeake & Ohio is feeling out the market on a number of machines, list of which will likely be bought early in May. Indications point to it being the largest list ever issued by this railroad. The New York Central, which has a large number of machine tools scheduled for purchase this year, continues to buy and issue inquiries, principally for single machines. Some of the equipment now being inquired for is said to be for Cleveland. The Lackawanna is understood to be closing on a small list for Buffalo. It is reported the New York, Ontario & Western will take no early action on the list of 15 machines or so mentioned last week. It now develops that the list was for estimating purposes.

Inquiry for locomotive cranes continues active, with orders being placed in fair volume. An improvement is also noted in overhead crane demand.

More Interest in Tools Shown

CLEVELAND, March 20.—Machinery users are showing more interest in dealers offerings but purchases mostly are of single tools. Some orders involve more than this number but these are rare. Several dealers report the heavier types of tools, such as large lathes, appear to be in most demand. However, punch presses also appear to be experiencing a fair demand. The railroads are not showing much activity in this district, orders from these interests being generally for single tools. The same is true regarding railroad inquiries current here, although it is understood the New York Central is about to issue a list a tool requirements for its local shops. However, nothing is definite regarding this.

The inquiry from the Ford Motor Car Co., Detroit, which calls for approximately $600,000 of equipment for the company's various plants is still current, although it is understood some buying against the list has been made. A southern Ohio machine shop is in the market for from 15 to 20 tools but purchases have been postponed until the company's plans are completed for a new plant building. The automotive industry is furnishing considerable tool inquiry. The Ajax Auto Parts Co., Racine, Wis., is in the market for a few machine tools, principally punch presses. The Seamless Steel Products Co., Milwaukee, also is in the market for a few machine tools, although it has purchased practically all necessary equipment for a new plant building which it plans to replace one damaged by fire.

General industrial operations are steadily increasing and a demand for tools for replacement purposes is developing. However, users are slow to close on needed equipment after issuing an inquiry. Considerable interest is shown in secondhand machinery. Despite the large amount of this on the market some difficulty is experienced in obtaining secondhand machinery which is in good condition. As a result practically every auction is well attended. During the past week the equipment of the B. & W. Tool & Die Works, this city, was auctioned, and as the machinery was in good condition, some high prices were developed. As a rule, however, used machinery prices are

weak. On the other hand new tool prices are stronger.

Textile Interests Heavy Buyers

BOSTON, March 20.—One of the principal manufacturers of milling machines issued a new schedule of prices the last part of last week averaging about a 10 per cent advance. Previous to this advance several textile interests closed for tools at the old price. One such Massachusetts interest bought 12 milling machines involving an investment above $20,000. Another textile machine manufacturer bought a special grinding machine and several other tools, and two other textile interests are on the point of buying. Railroads are taking more interest in tools. One New England road has just issued a list of six or seven tools which will probably be closed within a day or two. Scattered demand for miscellaneous tools continues favorable and inquiry is reported improved by most Boston dealers. Manufacturers of heavy machinery, including paper, mining and steel mill machinery, are busy and much of the new tool inquiry comes from this source. Activity among New England manufacturers of machine tools has further improved during the past week and the average schedule is now close to 80 per cent of normal. One manufacturer of small tools is operating overtime.

Pending Orders Are Numerous

PITTSBURGH, March 20.—March is turning out to be a quiet month in machine tool and equipment circles. Numerous projects are pending and a large number of inquiries are held in abeyance. A typical case is the purchase of a small lathe, requisitioned last October on which the management has yet to take action. Two or three machine tool sellers continue to work with the National Tube Co. on its two large lists and from time to time sales are consummated. Occasionally purchases are noted but the market lacks the life it had a month or so ago. At least two sizable sales were recorded this past week. A manufacturer in the Youngstown, O., district closed on five machines involving a lathe, milling machine and radial drill. The Diamond Machine Co., Monongahela, Pa., closed on its list of about 10 items, buying both new and used equipment, including a cutter grinder, two milling machines, two engine lathes, two turret lathes or screw machines, one vertical boring mill, a press, and a 5-foot radial drill. One dealer disposed of considerable woodworking machinery and two drill presses from his floor, while another dealer sold a new 20-inch lathe, a 16-inch lathe, a trimming press, and two drill presses. The Spang-Chalfant Co., Inc., has purchased a straightening machine from Manning-Maxwell & Moore, Inc.

Prices on both light and heavy equipment continue to become stronger, many crane manufacturers finding it necessary to obtain higher figures because of increasing costs. A line of shearing machinery has been advanced 5 to 15 per cent.

In connection with cranes, a number of single crane awards are noted and numerous propositions are up involving one or more cranes each, some of which have been held in abeyance for a long time. At least two inquiries are out for complete lines of foundry equipment. A nearby foundry interest wants a blower outfit and one or two others need sand mixing machines. Sales of steel flasks continue to be made from week to week as foundry business improves, all consuming lines being active.

Orders Come From Diversified Lines

CHICAGO, March 20.—While February brought a larger volume of business to machine tool sellers than January, indications are that the present month's demand will exceed either of the other months of the year. This demand is coming from all sources, the small machine shops, the larger jobbing shops, from railroads and large industrial concerns. Punch presses are in better demand than any other class of tool and are being bought singly and in groups of three or four. They are being taken by automobile accessory manufacturers, can makers and general manufacturers. The Rock Island railroad is inquiring for two drill presses and two woodworking machines. Other railroads, which have been expected to issue lists, have not yet done so, although information is that the Burlington railroad has its list under preparation. The International Harvester Co. and the motor companies in Wisconsin are buying occasional tools, as the need arises, but have not issued general inquiries. Buying of good secondhand

Crane Awards and Inquiries of the Week

Orders Placed

Two 25-ton locomotive cranes, with 50-foot boom and 1½-yard bucket, for Spadaro Contracting Co., Bronx, New York City to Brown Hoisting Machinery Co.

One 20-ton locomotive crane, 50-foot boom, for Micholitz & Co., Harrisburg, Pa., to Browning Co.

One 30-ton locomotive crane for Ford Motor Co., Detroit, to Browning Co.

One 150-ton wrecking crane, for the Central of Georgia, to Industrial Works.

One pile driver for Canadian National railroad.

One 150-ton wrecker for Illinois Central, to Industrial Works.

Four overhead electric cranes for Lackawanna plant of the Bethlehem Steel Corp., including two of 10 tons capacity, to unnamed builder; one 50-ton electric crane has been pending for the Lackawanna plant, but whether this was included in the above order has not been ascertained.

One 5-ton electric crane, 45-foot span, for James B. Leanhan, Inc., the Bronx, New York, was bought secondhand.

Two 3-ton, 2-motor cranes, 33-foot, 7-inch span, for Pecker Iron Works, Brooklyn, to Shepard Electric Crane & Hoist Co.

One 200-ton electric crane, 78-foot span, for Union Pacific railroad, to eastern crane builder.

Two 10-ton electric overhead cranes for Baldwin Locomotive Works, to eastern crane builder.

One 1-ton crane, 90-foot span, for Essex Ice & Cold Storage Co., Newark, to New Jersey Foundry & Machine Co.

One 10-ton electric crane, 47-foot 6-inch span, placed through New York City office of Honolulu Iron Works, Honolulu, Hawaii, with Chesapeake Iron Works.

One 5-ton crane for the Vulcan Mold & Iron Co., Latrobe, Pa., to the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

One double-leg double-trolley gantry crane, about 15 tons capacity, with several cantilevers for the central dock of the Carnegie Steel Co., Pittsburgh, to the Meade & Morrison Mfg. Co., East Boston, Mass.

One 10-ton crane for the United Alloy Steel Corp., Canton, O., to the Morgan Engineering Co., Alliance, O.

One 5-ton crane for the Sprague Electric Works, New Kensington, Pa., reported placed with an Ohio manufacturer.

One 15-ton, 1-motor crane with hoist for the Reliance Coke & Furnace Co., Claire, Pa., to the Northern Engineering Works, Detroit, Mich. The ore bridge for this plant was awarded to the Dravo Contracting Co., Pittsburgh.

One electric traveling crane for the Toronto, Ont., board of control, to John T. Hepburn, Ltd., Toronto, Ont.

One 10-ton electric traveling crane, three motors, with 46-foot span for the Marquette plant of the Charcoal Iron Co., Newberry, Mich., to the Northern Engineering Works, Detroit.

One transfer bridge with 46-foot span, with one 2-motor, 4-ton electric monorail hoist for the Charcoal Iron Co., to the Northern Engineering Works.

One 5-ton, 3-motor electric traveling crane with 69-foot span for the Standard Foundry Co., Buffalo, N. Y., to the Northern Engineering Works.

One 3-ton electric crane, 17-foot 6-inch span, for Chase Metal Works, Waterville, Conn., to Shepard Electric Crane & Hoist Co.

Orders Pending

One 20-ton electric overhead crane for American Locomotive Co.'s plant at Paterson, N. J.; the 150-ton overhead crane for this plant is still pending.

Cranes to be purchased by the American Type Founders Co., Jersey City, for its proposed plant at Elizabeth, N. J., to be of 1, 2 and 3 tons capacity each, of the underhung type; inquiry, however, not as yet issued; Day & Zimmerman, Philadelphia, engineers in charge.

One 5-ton single I-beam crane for National Bridge Works, Long Island City; pending.

One jib crane for the Bessemer & Lake Erie railroad, Pittsburgh; bids being taken.

One single I-beam crane for the Union railroad, Pittsburgh; bids being taken.

Two 15-ton cranes, one each for Soho and Woodlawn, Pa., plants of Jones & Laughlin Steel Corp., for loading barges on the river; bids being taken.

Cranes for practically all the United States Steel Corp. units in the Pittsburgh and Youngstown territories; bids being taken and tabulated.

One 10-ton crane for the Greenville Steel Car Co., Greenville, Pa.; order to be placed shortly.

equipment is active and indicates that users are seeking to fill their requirements at lower prices than are being asked for new tools. While prices have not changed recently, indications are they will advance on several lines within a short time.

Miscellaneous Equipment In Demand

MILWAUKEE, March 20.—Dealers in metalworking equipment report an active demand for miscellaneous tools, new and used, from the Wisconsin and Upper Michigan territory. Local manufacturers are fairly busy with unfilled and current orders. Prospects are considered bright for a continuously active trade through the spring. Numerous plants which have been idle are being taken over by established concerns which need more capacity but find economy in picking up shops at a low price rather than erecting additions or new plants. A large sawmill equipment order is coming up, the American-Oregon Lumber Co. now awarding contracts for the buildings, which take about 1200 tons of structural steel, let to the Wisconsin Bridge & Iron Co., Milwaukee. Much retooling is expected to be done by the B. F. Sturtevant Co., Boston, in the former Wisconsin Engine Co. plant at Corliss, Wis., which it has purchased as a western branch production center. Several manufacturers of Rockford, Ill., have taken over the Lipman Refrigerating Machine Co. at Beloit, Wis., and will build a machine shop addition to consolidate present scattered buildings. Public garage construction is active throughout this territory.

Tool Inquiry Continues Active

TORONTO, Ont., March 20.—Inquiry for machinery and machine tools continues active. The Canadian National railways has placed with Canadian and American builders and dealers its list aggregating some $500,000, and consisting of 95 machines and tools, including shapers, planers, lathes, saws, wood boring machines, hoists, drills, grinders, motors, and a wide variety of other tools as well as jacks and automatic tools, for car shops in Western Canada. While Canadian firms received a fair share of this business, there were many items that were only available through importation.

In addition to the demand for machinery and tools from the railways, industrial firms are showing more interest in the market and a strong demand now prevails for new works and replacements. The automobile industry is furnishing a good demand. Electrical equipment for projected power developments is in demand. The Wm. Kennedy & Sons, Ltd., Owen Sound, Ont., have the contract to supply hydraulic, and electrical machinery and apparatus for hydroelectric development at Megantic, Que. The Hydro Electric Power commission of Ontario, University avenue, Toronto, Ont., has awarded contracts to the Canadian General Electric Co., Toronto, for the supply of two 12,000-volt vertical generators, to cost $1,000,000; and one similar unit to the Canadian Westinghouse Co., Hamilton, Ont. The Board of Control, Toronto, Ont., has awarded contract for a traveling crane to John T. Hepburn, Ltd., 18 Van Horne street, Toronto.

The London Metal Products Co., London, Ont., manufacturer of electric washing machines, etc., is in the market for metal and woodworking machinery. The Canadian Pacific railway, Windsor station, Montreal, Que., is in the market for steel water tanks 60,000 to 100,000-gallon capacity; also for a 90-foot turntable. The Electropax Co., Toronto, will require equipment for a factory. The Sun Ray Mfg. Co., Guelph, Ont., is interested in equipment for the manufacture of stoves, etc.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

WATERBURY, CONN. — Approximately $125,000 will be expended by the American Metal Hose Co. on a 3-story factory building, 60 x 100 feet.

EDGEMOOR, DEL.—The Edgemoor Iron Co. has awarded a contract to Barclay, White & Co., 1713 Sansom street, Philadelphia, for a 1-story machine shop, 100 x 369 feet.

JACKSONVILLE, FLA.—The Florida Machine Works plans a 1-story machine shop, 60 x 130 feet.

BELLEVILLE, ILL.—The plant of the Oakland Foundry Co. recently was damaged by fire.

CHICAGO—Raymond Bros. Impact Pulverizer Co. plans a 1-story machine shop to cost about $60,000.

CHICAGO—The Melba Mfg. Co. plans a factory building at Michigan avenue and Forty-third street.

CHICAGO—The Timing Gears Corp., Fisher building, 343 South Dearborn street, has been incorporated with $10,000 capital stock by John A. Sizer, Richard O. Bauman and Warren S. Webb. The company is represented by Elmer A. Kimball, 179 West Washingon street.

CHICAGO—The Security Lock Co., 1305 Carmen avenue, has been incorporated with $200,000 capital stock by Louis Searbaro, Fred B. Federspiel and Rudolph Graebert. The company is represented by Louis Starboro, 1305 Carmen avenue.

CHICAGO—The White Metal Products Co., 1443 Cullerton street, has been incorporated with $5000 capital stock by Edward A. Hoberg, Rose S. Kolacek and Bohumil H. Svestka. The company is represented by Samuel B. Hill, 69 West Washington street.

CHICAGO—The Union Cab Mfg. Co., 10 South La Salle street, has been incorporated with $2500 capital stock by H. J. Maloney, R. L. McVean, J. C. Reis Jr., and others. The company is represented by Louis J. Behan, 10 South La Salle street.

CHICAGO—Walter Erman & Co., Inc., 332 South Michigan avenue, has been incorporated with 250 shares of no par value to manufacture and deal in scrap iron, metals, etc., by Walter Erman, Samuel E. Hirsch and Sidney J. Wolf. The company is represented by Ringer, Wilhartz & Hirsch, 76 West Monroe street.

CHICAGO—The Shepherd Engineering Association, Inc., 4200 Greenview avenue, has been incorporated with $10,000 capital stock to design, construct, manufacture and sell automatic and other machinery, etc., by A. D. Cloud, D. N. Shepherd and T. A. Rendle. The company is represented by D. N. Shepherd, 1417 North Dearborn street.

GRANITE CITY, ILL.—The Commonwealth Steel Co. contemplates a pattern shop.

JOLIET, ILL.—The J. L. Ferguson Co., 600 Railroad street, has been incorporated with $100,000 capital stock by Raymond A. Stephen, J. Dee Ferguson, Fred R. Adams and Thomas Dougall. The company will manufacture and

15 centimes le numéro — 73e année. — N° 362 — Jeudi 28 décembre 1922

Edition B

L'ÉTOILE BELGE

BUREAUX : Rue des Sablons, 13

ABONNEMENTS

AUJOURD'HUI SIX PAGES

L'Etoile Belge is a morning newspaper published in Brussels and has a large circulation throughout Belgium, in Luxemburgh and northern France.

Un câble reçu des services de la « Iron Trade Review », Cleveland, Ohio (Etats-Unis), signale « Nouvelles aciéries reprennent activité malgré peu de changement dans grève charbon. Combustible provient de mines non-syndiquées ou de stocks. Production en lingots 75 à 80 p. c. Peu de nouvelles commandes; ceci est vu favorablement par suite longs délais livraison, parfois en retard de six à dix semaines. Quotations acier et fonte fermes. Fonte régions nord 23 à 24 dollars pris aux fourneaux; 17 dollars 50 pour fonte retard de six à dix semaines. Cotations acier et dues 4 à 5 dollars meilleur marché port Atlantique, 2,500 tonnes fers belges, et 1,100 tonnes côte écossais vendus côte Pacifique. La Bethlehem Steel Cie a acheté la Lackawanna Steel Cie. La plus considérable, la U.-S. Steel Corporation étant quatre fois plus importante. D'autres combinaisons se préparent.

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Chicago	3.10c
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New York	3.34c
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San Francisco	3.65c
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IRON BARS

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Cleveland	3.75c
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Philadelphia	4.10c
San Francisco	4.75c
Seattle	4.85c
St. Louis	4.25c
St. Paul	4.40c

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Cincinnati	4.75c
Cleveland	4.60c
Detroit	4.90c
Los Angeles	6.10c
New York	4.90c
Philadelphia	4.90c
San Francisco	6.05c
Seattle	5.85c
St. Louis	5.10c
St. Paul	5.25c

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Cleveland	5.75c
Detroit	5.90c
Los Angeles	6.90c
New York	5.90c
Philadelphia	6.00c
San Francisco	6.90c
Seattle	6.85c
St. Louis	6.00c

BANDS

Boston	4.55c
Buffalo	4.20c
Chicago	3.85c
Cincinnati	3.85c to 4.00c
Cleveland	4.01c
Detroit	4.05c
Los Angeles	4.60
New York	4.14c
Philadelphia	4.10c
San Francisco	4.30c
Seattle	4.85c
St. Paul	4.10c

HOOPS

Boston	5.05c
Buffalo	4.50c
Cleveland	4.01c
Detroit	4.35c
New York	4.69c
Philadelphia, 1 inch and wider 20 gage and heavier	4.50c
Seattle	5.50c
St. Paul	4.70c

COLD ROLLED STEEL

Boston (rounds)	4.30c
Boston (shapes)	4.80c
Buffalo (rounds)	4.25c
Buffalo (shapes)	4.75c
Chicago (rounds)	4.10c
Chicago (shapes)	4.60c
Cincinnati (rounds)	4.05c
Cincinnati (shapes)	5.55c
Cleveland (rounds)	4.05c
Cleveland (shapes)	4.45c
Detroit (rounds)	4.10c
Detroit (shapes)	4.60c
Los Angeles (rounds)	5.10c
New York (rounds)	4.20c
New York (shapes)	4.70c
Philadelphia (rounds)	4.15c
Philadelphia (shapes)	4.65c
San Francisco (rounds)	5.30c
Seattle (rounds)	5.55c
St. Paul (rounds)	4.35c

deal in machinery, appliances, etc. It is represented by Fred H. Adams.

INDIANAPOLIS — The Universal Brass Works, Inc., has been incorporated with $15,000 capital stock by Edwin S. Harter, C. H. Meyer and L. A. Meyer.

JASPER, IND.—The Jasper Novelty Co. contemplates a plant addition.

BELL, KY.—The American By-Products Coal Corp. has been incorporated with $150,000 capital stock by M. J. Moss, Pineville, Ky., S. M. Loomis and Adolph Levy, Cincinnati.

LOUISVILLE, KY. — The Automotive Equipment Co. has been incorporated with $4000 capital stock by R. E. McConnell, W. V. Woodward and E. Steinfeld.

PORTLAND, ME.—The McCord Radiator & Mfg. Co. has been incorporated to build motor vehicles, aeroplanes, boats, etc., with 250,000 shares of stock without par value by M. F. Foster, M. G. O'Neil and A. B. Farnham.

BOSTON—The New England Power Co. has applied for authority to issue $3,000,000 of new common stock, the proceeds to be used in the construction of additions and improvements, including transmission lines.

GARDNER, MASS.—The Hedstrom Union Co. plans a manufacturing building.

WOBURN, MASS.—The B. & H. Electric Co., Inc., has let the contract for a 1 and 2-story, 120 x 180-foot with an ell 60 x 150-foot machine shop to cost $120,000.

BATTLE CREEK, MICH.—The plant of the United States Steel & Wire Co. recently was damaged by fire. It will be rebuilt.

BAY CITY, MICH.—The Gibb Instrument Co. is reported planning to enlarge and improve its plant.

DETROIT—The Meier-Mee Foundry Co. has been incorporated with $15,000 capital stock to engage in a general foundry business, by Edward L. Meier, 11 Hartford street and Gilbert H. Mee.

JACKSON, MICH.—The Kirsch Mfg. Co., maker of brass rods, etc., has purchased the plant of the Barnwell Mfg. Co.

ST. JOSEPH, MICH.—The Watts Laundry Machine Co. plans a 1-story factory addition, 60 x 80 feet, to cost about $50,000.

TRAVERSE CITY, MICH.—The Johnson-Randall Co. has plans for a 2-story plant addition, 80 x 160 feet, to cost about $80,000.

AMSTERDAM, N. Y.—The Mohawk Carpet co. plans a machine shop addition to cost about $60,000.

BROOKLYN, N. Y.—The Robert Findlay. Mfg. Co., 100 Lexington avenue, manufacturer of electric fixtures, plans a plant addition, 60 x 100 feet, to cost about $25,000.

BROOKLYN, N. Y.—The Henry Lohsea Auto Body Co. has been incorporated with $5000 capital stock by H. Lohsea, J. H. and K. I. Wasel. The company is represented by H. D. Levy, 88 Broadway.

BROOKLYN, N. Y.—The Silent Hoist Co. has been incorporated with $25,000 active capital by C. M. O'Keefe and others. The company is represented by Halsey & O'Keefe, 51 Chambers street.

BUFFALO—The Fedders Mfg. Co. plans a 2-story plant addition, 35 x 165 feet.

BUFFALO—The Hendon Chemical Co. has plans for the erection of a plant building.

BUFFALO—The Keystone Tool & Metal Parts Corp. has increased its capital stock from $50,000 to $100,000.

BUFFALO—The American Brake Shoe & Foundry Co. contemplates improvements to its plant.

BUFFALO — The Oldman-Magee Boiler Works has increased its capital stock from $5000 to $300,000. It is understood the company is planning to enlarge its facilities.

CLARENCE, N. Y.—The Buffalo Truck & Tractor Co. plans a 1-story plant addition to cost about $55,000.

NEW YORK—The Radio Engineering Co. of New York has increased its capital stock from $100,000 to $600,000.

NEW YORK—The Chino Copper Co., 25 Broad street, is reported considering the erection of some plant additions and the installation of labor saving machinery. It is estimated $150,000 will be expended.

NEW YORK—The Hydraulic Press Mfg. Co., 39 Cortlandt street, plans extensions and improvements to its plant at Mt. Gilead. O. F. B. McMillan is vice president and general manager.

NEW YORK—The American Bridge Co., 71 Broadway, plans to rebuild its shop at Elmira Heights, N. Y., which recently was damaged by fire. The damage at that time was estimated at $100,000.

NEW YORK—The Chelsea Steel Products Co. has been incorporated with $25,000 capital

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago** **Detroit**
San Francisco
Cincinnati

stock by E. H. Caterson, E. B. Kalbacher and J. M. Maher. The company is represented by T. F. Hyland, 43 Exchange place.

NEW YORK—The Dunn Pen Mfg. Corp. has been incorporated with $10,000 capital stock by H. N. Momenimen, C. E. Cimon and J. J. Haynes. The company is represented by R. W. Crawford, 2 Rector street.

NEW YORK—The Ingram-Richardson Mfg. Co., 227 Fulton street, maker of enameled iron signs, etc., plans the erection of a 1-story power house at its plant at Bayonne, N. J. It is understood the contract for the building has been let.

NEW YORK—The Bell Lighting Co. has been incorporated to make gas fixtures, etc., with $100,000 capital stock by C. A. Campbell, A. C. Worgren and W. Weigand. The company is represented by H. W. Van Alen, 186 Remsen street.

ROCHESTER, N. Y.—The Eastman Kodak Co. has awarded a contract to the Ridge Construction Co. for the erection of a power house, 80 x 110 feet, to be built at an estimated cost of $84,000.

ROCHESTER, N. Y.—The Empire Sprinkler Co., automatic fire apparatus, has been incorporated with $25,000 active capital stock by W. A. Yawman, E. E. Webb and K. Zimmerman. The company is represented by L. S. Pierce, Rochester, N. Y.

SYRACUSE, N. Y.—Work will be started shortly by the Onondaga Litholite Co., on a foundry addition.

WATERVLIET, N. Y.—The London Steam Turbine Co. plans the erection of a plant at an estimated cost of $150,000.

ASHEVILLE, N. C.—The Southern Steel & Cement Co., Inc., will erect a warehouse, 40 x 300 feet.

KERNERSVILLE, N. C.—The American Iron Works, recently organized with $75,000 capital stock, plans a plant. Allen C. and Ora L. Smith are officers of the company.

KERNERSVILLE, N. C.—The American Iron Works, Inc., has been incorporated with $75,000 capital stock by Allen C. Marion, C. and Ora L. Smith. Erection of a building is planned.

ROANOKE RAPIDS, N. C.—The Roanoke Rapids Power Co. plans a power plant.

STATESVILLE, N. C.—A plant for the manufacture of automobile tires and assessories is to be established here by a company recently organized with $100,000 capital.

STATESVILLE, N. C.—The C. H. Turner Foundry Co., Inc., is erecting a plant here. The company was recently organized with $100,000 capital.

BRIDGEPORT, O.—Dillon Bros. Machine Co. is having plans drawn for the erection of a 1-story machine shop, 50 x 100 feet.

CINCINNATI—The Merkel Bros. Co. plans a light manufacturing building.

CINCINNATI—The brass foundry of the John B. Douglas Co. will be moved shortly to the new plant in Carthage, O.

CINCINNATI—The Lunkenheimer Co. has started moving its foundry division from the old factory in North Fairmount, to the new building in Carthage, O.

CINCINNATI—The Witt Cornice Co., manufacturer of galvanized ware, has purchased a site on which it is reported considering the erection of a new plant building. J. W. Witt is president of the company.

CINCINNATI—The plant of the Bromwell Brush & Wire Goods Co., manufacturer of wire goods, etc., recently was damaged by fire. Plans of the company regarding rebuilding have not been announced.

CINCINNATI—The Kirk & Blum Mfg. Co. has been incorporated with $250,000 capital stock by Sylvester W. Kirk, Richard J. Blum and others. The company, which manufactures dust-collecting systems, has been operated as a partnership for the past 12 years.

CLEVELAND—The Federal Brass Co., 100 Champlain avenue, has taken out a permit to erect a plant building, 60 x 139 feet, at an estimated cost of $50,000.

CLEVELAND—The Lindsay Wire Weaving Co., 14025 Aspinwall avenue, has taken out a permit to erect a factory building to be built at an estimated cost of $50,000.

CLEVELAND—The Rainey Tool Co. has been incorporated with $10,000 capital stock by Cedric G. Smith, Harry W. McLeod, E. N. Clark, C. Wiedel and E. M. Williams.

CLEVELAND—The C. W. Cadle Co. has been incorporated with $16,250 capital stock by Dorr E. Warner, W. S. Fallon Jr., J. C. Logue, M. A. Patterson and Wilbur T. Smith.

CLEVELAND—The Morrison Equipment Co. has been incorporated with $10,000 capital stock by Egbert R. Morrison, A. H. Cline, W. A. Carlson, R. S. Tappenden and A. U. Gallagher.

CLEVELAND—The Booth Metals Co. has taken a five year lease from the Superior Foundry Co. on part of the former plant of the Economy Stove Co. at Scranton road and the Big Four railroad.

CLEVELAND—A permit has been issued to the W. S. Tyler Co., 3605 Superior avenue, for the construction of a 6-story factory building to be built at an estimated cost of $400,000. The Hunkin-Conkey Construction Co. has the contract.

COLUMBUS, O.—The Dennis Engineering Co. has been incorporated with $10,000 capital stock by H. W. Dennis, James S. Dennis, C. D. Dennis, C. A. DeLay and Hugh J. Bergin.

CLEVELAND—The Perfection Coaster Mfg. Co. plans the erection of a 2-story brick building, 100 x 400 feet.

CLEVELAND—The F. B. Stearns Co., automobile manufacturer, plans the erection of a 2-story plant addition, 220 x 300 feet. Work on the new structure is to begin immediately.

COLUMBUS, O.—The Ohio Pump & Brass Co. contemplates a new plant.

DAYTON, O.—The Standard Register Co. has taken out a permit to erect a 2-story office building to cost about $71,000.

Industrial Business Changes Recently Announced

SEVERAL changes in its Los Angeles office have been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The power division has been changed to the central station division with J. C. Jones as manager. He also has been placed in charge of the sale of supply apparatus in the territory. The railway division has been changed to the transportation division and G. B. Kirker appointed manager. The merchandising division has been established with J. H. Jamison as manager, and an engineering division with R. A. Hopkins also has been established.

* * *

The Harvey Electric Co., Chicago, has changed its name to the Chicago Forging & Mfg. Co.

* * *

The Blanchard Instrument Co. has moved its plant from 7 Deacon street, Cambridge, Mass., to 205 Broadway, that city.

* * *

The Lawrence Machine Co., Lawrence, Mass., recently moved into its new office and factory at Lawrence.

* * *

The corporate name of the F. P. Screw Co., Cleveland, has been changed to the Cleveland Cap Screw Co.

* * *

The National X-Ray Reflector Co., Chicago, has announced the opening of an office at 750 Prospect avenue, room 408, Cleveland, in charge of H. L. Wright.

* * *

Detroit offices of Wing & Co. have been moved from 625 Book building, that city, to the seventeenth floor of the Real Exchange building.

* * *

A Cleveland sales office has been opened in the Hanna building by the Atlas Steel Corp., Dunkirk, N. Y. It is in charge of W. H. White.

* * *

Offices have been opened in Cleveland at 2104 East Superior avenue, by the Gibb Instrument Co., Bay City, Mich., in charge of W. O. Little.

* * *

New York offices have been opened by the Howell Electric Motors Co., Howell, Mich., at 17 East Forty-second street, with R. W. Baker in charge as district manager. A complete stock of motors is being carried in the New York warehouse.

Need a Small Crane?

The Brownhoist 2-speed Crane is made for just your kind of work. This crane—

Works with—

Bucket, Hook,
Magnet, Shoveling
Attachment, etc.

Operates by—

Steam
Gas Engine
Electricity

The Brown Hoisting Machinery Co., *Cleveland, Ohio*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

Products: Locomotive Cranes, Buckets, Chain and Belt Conveyors, Storage Bins, Etc.

BROWNHOIST

DAYTON, O.—The Dico Ignition Co. has been incorporated with $20,000 capital stock by Isaac Warner, H. F. Sadgebury, H. G. Kenner, I. L. Hauer, H. F. Sadgebury and R. W. Patterson.

KENTON, O.—The Live Poultry Transit Co., Chicago, is reported planning the erection of a car repair shop here at an estimated cost of $50,000. Frank I. Mudd is president.

MASSILLON, O.—The Massillon Aluminum Co. has increased its capital stock from $200,000 to $500,000.

PORTSMOUTH, O.—The Kloeb-Cullum Stove & Furnace Co. has been incorporated with $50,000 capital stock by H. H. Mechlin, C. A. K. Crabtree, W. J. Cullum, W. A. Riffle and Van M. Denton. The company is establishing a plant at 509 Front street, this city, for the manufacture of stoves, furnaces, etc.

TOLEDO, O.—The D. Vilbiss Mfg. Co. is drawing plans for the erection of a 3-story plant addition, 50 x 600 feet.

TOLEDO, O.—The B. D. & W. equipment Co. has been incorporated with $125,000 capital stock by F. W. Danberg, C. D. Brown, H. A. Danberg, A. G. Way and M. B. McCarthy.

TOLEDO, O.—The Toledo Machinery Exchange Co. has been incorporated with $20,000 capital stock by William Arenson, Herman J. Arenson, Maurice C. Davis and Samuel R. Harris.

TOLEDO, O.—The Hall Cylinder Hone Co. has been incorporated with $100,000 capital stock by Paul William Alexander, M. E. Aderman, Marie Warnke, Ione Schrinel, and Stuart S. Wall.

YOUNGSTOWN, O.—The General Fireproofing Co., manufacturer of steel office supplies, has purchased from the Detroit Stove Works a 5-story plant containing 63,000 square feet of floor space at 2921-29 South La Salle

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.95
Mesabi Bessemer, 55 per cent iron	5.70
Old Range nonbessemer, 51½ per cent iron	5.20
Mesabi nonbessemer, 51½ per cent iron	5.05

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent	9.50 to 10.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	10.00 to 11.00
Algerian low phosphorus, 52 to 54 per cent	nominal
Swedish and Norwegian low phosphorus, 68 per cent	nominal
Swedish foundry or basic, 68 per cent	nominal
Spanish foundry or basic, 52 to 54 per cent	nominal

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganesese contained.

Brazilian, minimum 47 per cent	nominal
Indian, 48 to 50 per cent	nominal
Caucasian, 53 to 55 per cent	.41 cents c.i.f. tidewater

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per ton	$21.50

Rivets

Structural rivets, Pittsburgh	3.25c to 3.50c
Boiler rivets, Pittsburgh	3.35c to 3.60c
Rivets, 7/16-in. and smaller	.60 and 5 off

Nuts and Bolts

NUTS
(Up to 1¼ and 1⅛ inches inclusive)

Hot pressed square or hexagon blank	$3.25 off list
Hot pressed square or hexagon tapped	$3.00 off list
Cold punched square or hexagon blank	$3.25 off list
Cold punched, square or hexagon, tapped	$3.00 off list
Cold punched semifinished hexagon nuts ⅜-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts 9/16-inch and smaller	70-10-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread	45-10 off
Cut thread	45 off
Larger and longer	45 off

MACHINE BOLTS
(¾ x 4 inches, hot pressed nuts)

Rolled thread	50-10 off
Cut thread	50 off
Larger and longer	50 off

(¾ x 4 inches, cold punched nuts)

Cut thread	40-5 off
Larger and longer	40-5 off
Lag screws	50-10 off
Plow bolts Nos. 1, 2 and 3 heads	50 off
4 to 10 heads	50+20
Tap bolts	25-5 off
Bolt ends with hot pressed nuts	50 off
Bolt ends with cold punched nuts	40-5 off
Blank bolts	50 off
Rough stud bolts with nuts	40-5 off

WASHERS

Wrought washers	$5.75 off list

Steel Pipe

(Effective Feb. 1-3, 1923)

Pittsburgh basing discounts, jobbers, car-

	Black	Galvanized
Butt Weld		
⅛-inch	47	21½
¼ and ⅜-inch	53	27½
½-inch	58	44½
¾-inch	62	50½
1 to 3-inch	64	52½
Lap Weld		
2-inch	57	45½
2½ to 6-inch	61	49½
7 to 8-inch	58	45½
9 to 12-inch	57	44½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	43	26½
¼ and ⅜-inch	49	32½
½-inch	55	44½
¾-inch	60	49½
1 to 1½-inch	62	51½
2 to 3-inch	63	52½
Lap Weld		
2-inch	55	44½
2½ to 4-inch	59	48½
4½ to 6-inch	58	47½
7 to 8-inch	54	41½
9 to 12-inch	48	35½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	44	34½
¾ to 1½-inch	47	37½
2 to 2½-inch	49	39½
Lap Weld		
2-inch	43	34½
2½ to 4-inch	45	36½
4½ to 6-inch	44	35½
7 to 8-inch	40	27½

Wrought Iron Pipe

(Effective Jan. 23, 1923)

Pittsburgh basing discounts, jobbers, carloads

	Black	Galvanized
THREADS AND COUPLINGS		
Butt Weld		
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
7 to 8-inch	28	13
9 to 12-inch	26	11
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	..

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL
(Effective Jan. 23, 1923)

1¼-inch	17½ off
2 and ¼-inch	20 off
2½ to 3-inch	40 off
3¼ to 4-inch	45 off

CHARCOAL IRON
(Effective Dec. 6, 1922)

1½-inch	+16
1¾-inch	+ 6
2 and 2¼-inch	4
2½ to 3-inch	9
3¼ to 4½-inch	11

SEAMLESS COLD DRAWN
(Effective Jan. 24, 1923)

1-inch	51
1¼ and 1½-inch	43
1¾-inch	27
2 and 2¼-inch	27
2½ and 2¾-inch	31
3-inch	35
3¼ to 4-inch	40
4½ and 5-inch	32

SEAMLESS HOT ROLLED

3-inch	37
3¼ to 4-inch	42

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING
Base Discounts

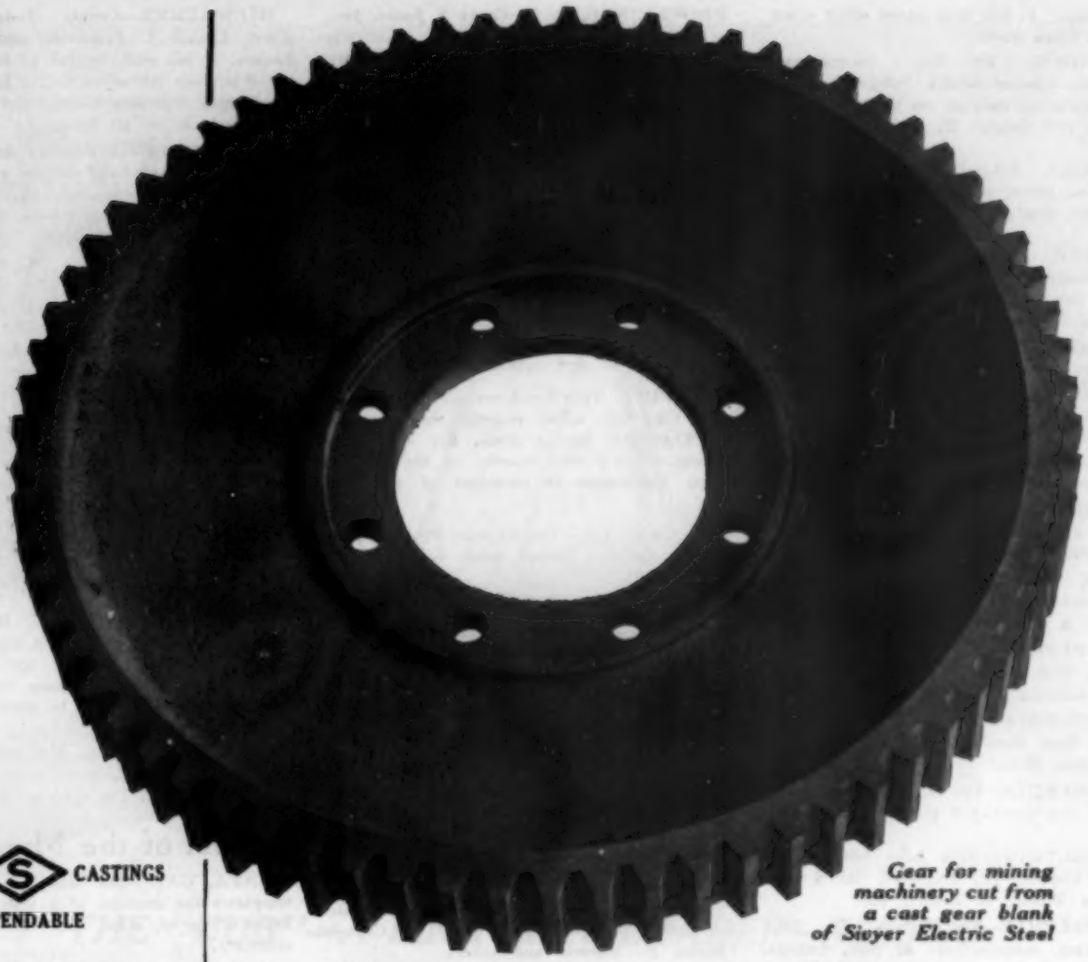
Carbon, 0.10 to 0.20 per cent	85 off
Carbon, 0.30 to 0.40 per cent	83 off
Carbon, 0.40 to 0.50 per cent	82 off

Plus usual differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES
Net prices per foot, f.o.b. Pittsburgh

Outside diameter	Gage	Price
2-inch	12-gage	14c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	19c
3-inch	7-gage	34c
1½-inch	9-gage	13¼c
5½-inch	9-gage	53c
5½-inch	9-gage	55c

Plus usual extras for forming and for long lengths.



Gear for mining machinery cut from a cast gear blank of Sivyer Electric Steel

SIVYER (S) CASTINGS

DEPENDABLE

Send Blue Prints

If certain parts of your product—which are now either cast or hammer-forged and welded—ought to be more effectively safeguarded against failure in service, send us your blue prints with an explanation of your difficulties. We will be glad to study the problems involved and recommend possible solutions without obligation on your part.

If some of your planing and boring tools require an unusual amount of grinding and replacement, it may be that there are sand and slag on the surface of some of the castings now used. Tools are keen inspectors of castings and originate many of the orders that come to Sivyer from more than a thousand miles away. If your usual sources of supply seem unable to get rid of the trouble, send us your blue prints of the parts in question, together with details about your difficulties. Without obligation on your part we will study the problems of molding practice involved and suggest methods for producing castings with uniformly good machining quality.

Illustrating Interior and Exterior Integrity

CUT gears, like the one above, illustrate the uniformly honest surfaces and thoroughly sound interior of Sivyer Electric Steel Castings. To show the satisfactory machining costs established by castings like this, the surfaces have to be uniformly free from sand and slag. In addition, the interior of the casting must be free of imperfections — or rejections after partial machining would increase the cutting expense. The low cost of cutting gears from Sivyer blanks is, therefore, most interesting evidence of interior and exterior integrity. It is this uniform honesty that is leading so many manufacturers of mining machinery to use castings of Sivyer Electric Steel to safeguard their product against failures in service.

SIVYER STEEL

SIVYER STEEL CASTING COMPANY, MILWAUKEE

street, Chicago. It has also leased office space at 10 North Clark street.

ALLENTOWN, PA.—The International Radiator Co., Commonwealth building, is reported planning to enlarge its plant. Arthur E. Nicholas and George H. Ormrod head the company.

BERNVILLE, PA.—The Bernville Light & Heat Co. plans extensions and improvements to its plant. O. C. Showers is president.

DUQUESNE, PA.—The Royal Mfg. Co. plans to rebuild its factory building which recently was damaged by fire. It will be two-stories, 75 x 125 feet, and cost about $100,000.

HAZELTON, PA.—Part of the plant of the Hazelton Iron Works recently was damaged by fire.

LANCASTER, Pa.—The Pennsylvania Water & Power Co. is buying equipment for a large hydroelectric plant being erected at Hootwood on the Susquehanna river.

MEADVILLE, PA.—The Bronze Metal Co. plans a 1-story plant building to cost about $45,000.

MILTON, PA.—The Shippers' Car Line Co., manufacturer of railroad car equipment, plans a plant to cost about $65,000.

PHILADELPHIA—The Ferco Machine & Screw Co., 3438 North Mervine street, plans a factory building.

PHILADELPHIA—Bids will be received shortly by Max Bernhardt for a plant addition for Kurtz Bros.

PHILADELPHIA—The A. B. C. Porch Enclosure Co. has completed plans for a factory building.

PHILADELPHIA.—Bids have been closed by J. F. Vogdes, Jr., architect, for a mill building for Woods & Logan, Inc.

PHILADELPHIA—The Kitson Co., 2815 Oakford street, manufacturer of pipe, fittings, etc., has acquired a site for a new plant.

PHILADELPHIA—A warehouse will be erected by the North Philadelphia Plumbing Supply Co.

PHILADELPHIA—The Keystone Spring Works has awarded a contract to F. G. English & Son, for a small plant addition.

PHILADELPHIA—S. S. Redifer & Co., 139 Race street, manufacturer of iron shoe lasts, etc., plans a 2-story plant building, 50 x 100 feet.

PHILADELPHIA—A $100,000 warehouse will be erected here by the Penn Door & Sash Co. M. Ward Easby, Inc., is the general contractor.

PHILADELPHIA—A $15,000 warehouse addition will be erected by the George Kessler Contracting Co., general contractor, for the Beck Wall Paper Co.

PHILADELPHIA—The Brown Instrument Co., Wayne avenue and Roberts street, has awarded a contract to R. C. Ballinger, 925 Walnut street, for the erection of a 1-story plant addition.

PHILADELPHIA—The Keystone Spring Works, Thirteenth and Buttonwood streets, has awarded a contract to F. G. English & Son, 1608 North Carlisle street, for the erection of plant additions and improvements.

READING, PA.—The Reading Hardware Co. has plans for a 1-story addition to its foundry, 80 x 260 feet.

SCRANTON, PA.—P. F. & M. T. Howley, Wyoming avenue, contemplate the erection of a 1-story plant to be devoted to the manufacture of sheet metal products. It is estimated $37,000 will be expended on the project.

WARREN, PA.—The Seneca Oil Works, Inc., South Carver street, plans extensions and improvements to its plant.

PROVIDENCE, R. I.—Gates & Jones, Inc., has been incorporated to deal in machinery with $75,000 capital by Marcus W. Jones, Clarence A. Gates and John F. O'Donnell.

PROVIDENCE, R. I.—The Frank L. Wilmarth Co. has been incorporated to make jewelry with $50,000 capital by Ralph M. Greenlaw, C. L. Barnbrook and C. E. Waterman.

CHATTANOOGA, TENN.—The Walsh & Weidner Boiler Co. has increased its capital stock from $700,000 to $1,000,000.

MEMPHIS, TENN.—The Economy Ice Machine Co. has been capitalized with $250,000 for the establishment of a plant for the manufacture of ice and refrigerating machines.

MEMPHIS, TENN.—America's Best Trailer Truck Co., Inc., which recently was organized with $1,000,000 capital stock, has acquired a building which it will remodel for its own use. Joseph Newberger is president of the company.

GRAHAM, VA.—The Graham Furnace Corp. has increased its capital stock from $200,000 to $1,000,000.

RICHMOND VA.—The Frictionless Metal Co. has leased a 3-story factory buidling at St. Louis, which it will utilize for the production of babbitt metal. The company's present plants, it is understood, which are located in this city and Montreal, will be moved to St. Louis. C. W. Bourne is president of the company.

ROANOKE, VA.—The Roanoke Tire & Rubber Co. is having plans drawn for the erection of a 3-story factory building, 90 x 300 feet.

DUNBAR, W. VA.—The Gravely Motor Plow & Cultivator Co. has been incorporated with $200,000 capital stock by B. F. Gravely, Charles F. Sterrett and others.

BELOIT, WIS.—The N. G. Gaston Scale Co. will rebuild its plant, which was damaged by fire recently.

EAU CLAIRE, WIS.—The local office of the state highway commission is taking bids until March 22 for the construction of a reinforced concrete arch bridge estimated to cost $240,000, at Madison street, Eau Claire. Specifications call for 335 to 340 tons of reinforcing bars and 50 to 55 tons of structural steel.

GREEN BAY, WIS.—The Green Bay Foundry & Machine Works plans to enlarge its plant by the erection of additions to its casting shop. It is estimated $50,000 will be spent in improving the plant. R. A. North is president.

MADISON, WIS.—The site of 60 x 125 feet at Butler and Webster streets has been purchased by Gill Bros., who will begin work April 1 on a 4-story fireproof garage and repair shop, costing $85,000 with full equipment.

MADISON, WIS.—To provide for enlargement of its plant, the Wisconsin Foundry & Machine Co. has purchased the lot, 60 x 150 feet, adjoining its present works at 625-629 East Main street.

MILWAUKEE—The McClymont Marble Co. will build a machine shop, 60 x 250 feet, for occupancy by the Seamless Steel Products Co., at Twenty-seventh and Canal streets.

MILWAUKEE—The general warehouse of the Shadbolt & Boyd Iron Co. at Wright and Holton streets was damaged by fire March 12 with a loss of $100,000. A new building will be erected.

MILWAUKEE—Ruth & Co. has been incorporated to manufacture and deal in machinery with 500 shares of no par value by A. W. Scheife, R. E. Scheife and O. P. Kamschulte.

MILWAUKEE—County Judge John C. Karel, Caesar J. Paikowski and Herman H. Enders, of his staff, appear as incorporators of the Wisconsin Abrasives Co., a $25,000 corporation which will manufacture and deal in abrasive products of all kinds.

MILWAUKEE—A machine shop and service station, 80 x 115 feet, will be erected at Van Buren and Biddle streets by the Wisconsin Magneto Exchange, occupying leased quarters at 528-530 Milwaukee street. It builds and rebuilds electrical apparatus for automobiles.

OSHKOSH, WIS.—C. R. Meyer & Sons Co. have the general contract to build a sawmill, planing mill and furniture factory costing $100,000 for the Badger Lumber & Mfg. Co., replacing the group wiped out by fire several months ago.

STOUGHTON, WIS.—Bids will be asked soon for the installation of a 1000-gallon centrifugal pump in the North Division street deep well of the city water works system.

WAUWATOSA, WIS.—A. V. Brigham, city clerk, is taking bids until March 16 for furnishing and installing a 1000-gallon centrifugal or deep well turbine pump in the city water plant.

WEST ALLIS, WIS.—W. D. Darby, city engineer, has been ordered to make plans for a $40,000 municipal garbage incinerating plant, the building to accommodate two 20-ton furnaces, of which one will be installed at once.

WEYAUWEGA, WIS.—A high school costing $125,000 will be erected during the spring and summer. Vocational training shops will be established in the new building.

West of the Mississippi

NAPA, CAL.—The Rawling Mfg. Co. contemplates the erection of a plant here for the manufacture of vises, etc. E. H. Brown is secretary.

ASHCROFT, COLO.—The Belle Marie Mining & Milling Co. plans the erection of a power house and mechanical shop. A. J. Petelinz, 428 Grand avenue, Milwaukee, is engineer in charge.

MANSFIELD, LA.—The DeSoto Foundry & Machine Co. has let the contract for the erection of a 40-foot extension to its plant.

MINNEAPOLIS—The Diamond Steel Products Co. contemplates the erection of a 2-story plant addition.

MINNEAPOLIS—The Campbell Steel Products Co. has been incorporated with $100,000 capital stock by R. M. Crounse, L. P. McNally and William W. Merill.

ST. PAUL—The Ford Motor Co. expects to erect within a year an automobile plant here. This announcement followed the action of the Federal Power commission in granting a preliminary permit for the development of hydroelectric power at the Twin Cities.

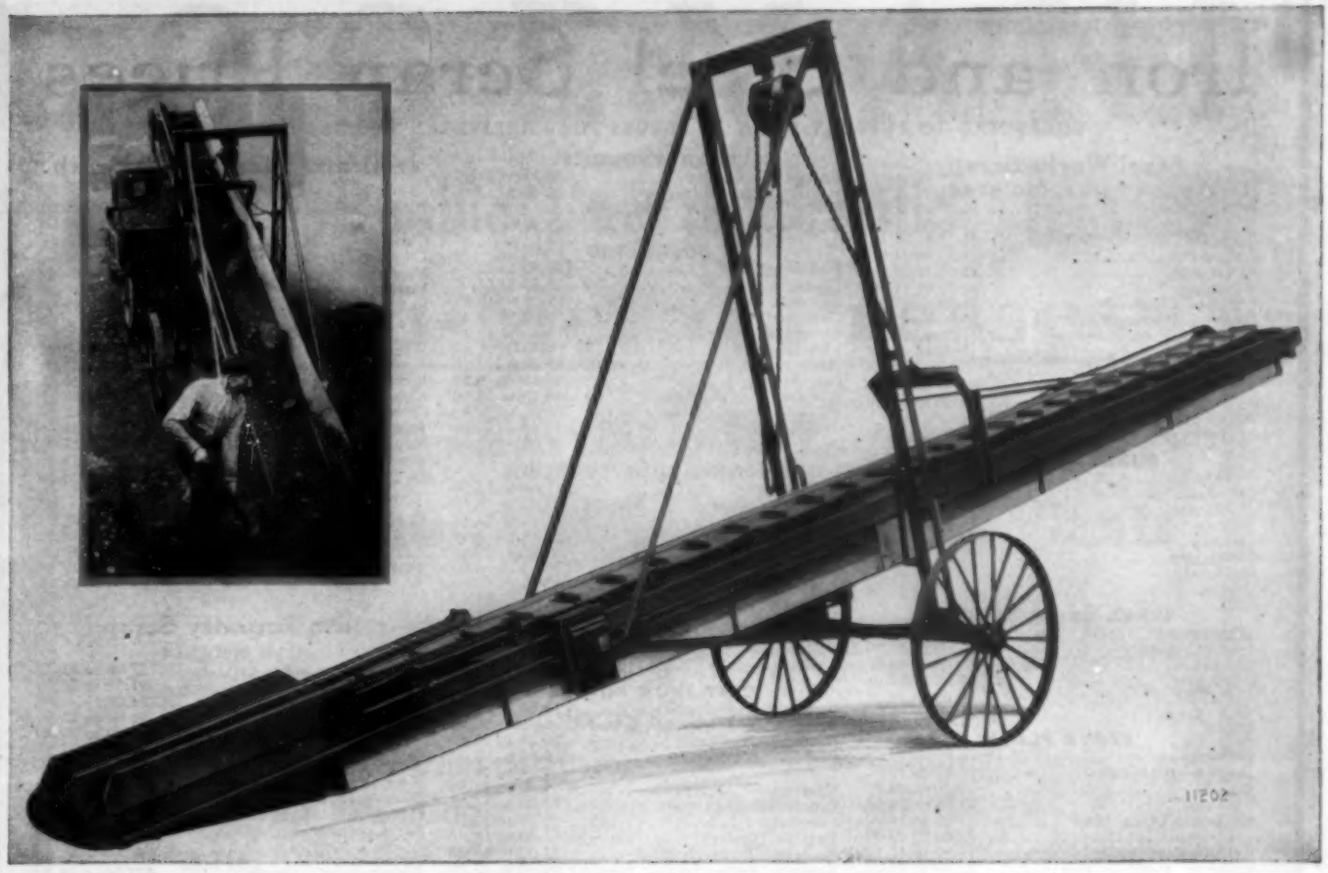
JOPLIN, MO.—The Joplin Steel & Malleable Co. plant, idle for the past year and a half, has been leased by J. M. and J. B. Lininger of Sharon, Pa., for the manufacture of steel castings.

KANSAS CITY. MO.—The Newman Oil Burner Co. has been incorporated by A. P. Newman, C. D. Payne and A. E. Webb.

KANSAS CITY, MO.—The Rolsky Mfg. Co. has been incorporated with $50,000 capital stock to manufacture refrigerators, etc., by Emanuel Rolsky, Max Eichenberg and Hyman Spitcaufsky.

ST. LOUIS—The Green Car Wheel Mfg. Co., 3000 North Broadway, plans the erection of a factory and foundry building.

ST. LOUIS—The Frank J. Smith Foundry Co. has been incorporated with $8000 capital stock by F. J. Smith, O. F. Karbe and J. J. Waddock.



THE "CUB"—A LINK-BELT LOADER—$585.00

FEATURES

Simplicity of design.
Length of conveyor, 21 ft.
Substantial construction—weighs about twice as much as some machines of this type.
18" wide belt, giving large carrying capacity.
Belt guaranteed against cutting or fraying.
Wide loading hopper at foot of conveyor is hinged—easily and quickly opened.
Requires little power—2 H.P. motor, 2 or 3 phase, 60 cycle, A. C.

HERE'S a seven-hundred-dollar Link-Belt Portable Belt Conveyor at our new low price—$585.00, F. O. B. Philadelphia. It is one of our standard types, built to the high Link-Belt standard. It is guaranteed.

Increased production, due to our large volume of sales, has made this low price possible.

Even if you load only a small quantity of material—at intervals—can you afford to pass up an opportunity like this? Fill out and return the coupon.

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LINK-BELT COMPANY, NICETOWN, PHILADELPHIA, PA. Date.....

☐ We are interested in the Link-Belt "Cub" Portable Belt Conveyor. Send us further information.

☐ We handle ..... tons of ..... per ..... from..... to .....

☐ Send us the Link-Belt Portable Loader Book No. 550, showing the complete Link-Belt line of Portable Loaders.

Name ..... Firm.....

Address ..... City..... State.....

IRON TRADE REVIEW

LINK-BELT

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	16.50 to 17.50
Boston (dealers)	19.50 to 20.00
Buffalo	24.75 to 25.75
Chicago	23.50 to 24.00
Cleveland	25.00 to 25.50
Cincinnati	21.00 to 21.50
Detroit (dealers)	24.00 to 24.50
Eastern Pennsylvania	26.00 to 27.00
New York (dealers)	21.00 to 21.50
Pittsburgh	27.00 to 27.50
San Francisco	14.00
St Louis	23.00 to 23.50
Valleys	26.50 to 27.00
No. 1 railroad steel New York (dealers)	22.00 to 22.50

BUNDLED SHEETS

Buffalo	$16.25 to 16.75
Cleveland	19.75 to 20.00
Cincinnati	16.50 to 17.00
Detroit	14.50 to 15.00
Eastern Pennsylvania	22.00 to 23.00
Pittsburgh	24.00 to 24.50
St. Louis	16.50 to 17.00
Valleys	20.50 to 21.50

STEEL RAILS, SHORT

Birmingham	17.00 to 19.00
Boston (dealers)	20.00 to 21.00
Chicago	26.25 to 26.75
Cincinnati	24.00 to 25.00
Cleveland	24.00 to 24.25
St. Louis	24.50 to 25.00

STOVE PLATE

Birmingham	18.00 to 20.00
Boston (consumers)	20.00 to 21.00
Buffalo	20.50 to 21.00
Chicago	25.75 to 26.25
Cincinnati (net ton)	17.50 to 18.00
Cleveland	22.00 to 23.00
Detroit (net ton) (dealers)	19.00 to 19.50
Eastern Pennsylvania	22.00 to 23.00
New York (dealers)	19.00 to 19.50
Pittsburgh	20.50 to 21.00
St. Louis	22.00 to 22.50

LOW PHOSPHORUS

Buffalo	28.00 to 29.00
Cincinnati	21.00 to 22.00
Eastern Pennsylvania	30.00 to 31.00
Pitts. billet and bloom crops.	33.00 to 34.00

SHOVELING STEEL

Chicago	23.00 to 23.50
Pittsburgh	22.50 to 23.00
St. Louis	22.75 to 23.00

KNUCKLES, COUPLERS & SPRINGS

Chicago	29.00 to 29.50
Eastern Pennsylvania	28.00 to 29.00
Pittsburgh	29.50 to 30.00
St Louis	26.75 to 27.25

COMPRESSED SHEETS

Buffalo	$22.00 to 22.50
Chicago	20.50 to 21.00
Pittsburgh	26.00 to 26.50
Cleveland	23.00 to 24.00
Detroit (dealers)	21.00 to 21.50
Valleys	21.50 to 22.00

FROGS, SWITCHES, GUARDS

Chicago	23.50 to 24.00
Eastern Pennsylvania	26.00 to 27.00
St. Louis	23.75 to 24.25

BOILER PLATE, CUT

St. Louis (dealers)	17.00 to 17.50

ANGLE BARS—STEEL

Chicago	26.00 to 26.50
St. Louis	25.00 to 25.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	$20.00 to 21.00
Boston (dealers)	21.00 to 22.00
Buffalo	21.00 to 21.50
Chicago, No. 1	23.75 to 24.25
Chicago, No. 2	23.50 to 24.00
Cincinnati No. 1	19.00 to 20.00
Cleveland No. 1	22.00 to 23.00
Eastern Pennsylvania, No. 1	28.00 to 29.00
Pittsburgh No. 1	25.00 to 25.50
Pittsburgh, No. 2	27.00 to 27.50
New York, No. 1 (dealers)	21.50 to 22.50
St. Louis No. 1	22.50 to 23.00
St. Louis No. 2	21.75 to 22.25

WROUGHT PIPE

Boston (dealers)	16.00 to 16.25
Buffalo	18.50 to 19.00
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	16.75 to 17.25

YARD WROUGHT

Boston	20.50 to 21.00
Eastern Pennsylvania	26.00 to 27.00

CITY WROUGHT

New York, long	$18.50 to 19.00

BUSHELING

Buffalo, No. 1	$21.50 to 22.00
Chicago No. 1	22.50 to 23.00
Chicago, No. 2	15.50 to 16.00
Cincinnati No. 1	18.00 to 18.50
Cleveland No. 1	19.25 to 19.50
Cleveland No. 2	18.00 to 18.50
Detroit, No. 1	17.00 to 17.50
Detroit No. 2 (new)	16.00 to 16.50
Detroit, No. 2 (old)	14.50 to 15.00
Eastern Pennsylvania	24.00 to 25.00
Pittsburgh, No. 1	23.50 to 24.00
St. Louis No. 1	20.00 to 20.50

MACHINE SHOP TURNINGS

Birmingham	$11.00 to 12.00
Boston (dealers)	16.00 to 16.50
Buffalo	17.50 to 18.50
Chicago	17.00 to 17.50
Cleveland	19.00 to 19.25
Cincinnati (net ton)	14.50 to 15.00
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania	22.00 to 23.00
New York (dealers)	16.50 to 17.00
Pittsburgh	21.50 to 22.00
St. Louis	15.00 to 15.50
Valleys	19.50 to 20.00

CAST IRON BORINGS

Birmingham (chemical)	16.50 to 17.00
Birmingham, borings (plaint)	12.00 to 12.50
Boston (chemical)	20.00 to 21.00
Boston (dealers)	16.50 to 17.00
Buffalo	19.00 to 20.00
Chicago	19.00 to 19.50
Cincinnati (net ton)	15.00 to 16.00
Cleveland	20.00 to 21.00
Detroit (dealers)	17.50 to 18.00
Eastern Pennsylvania	22.00 to 23.00
Eastern Pennsylvania (chem.)	26.00 to 27.00
Pittsburgh	22.50 to 23.00
New York (dealers' price)	16.00 to 16.50
St. Louis	17.00 to 17.50
Valleys	21.00 to 21.50

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	14.00 to 14.50
Cleveland	19.25 to 19.75
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania	18.50 to 19.00
New York (dealers)	15.50 to 16.00

IRON AXLES

Birmingham	30.00 to 31.00
Boston	27.00 to 28.00
Buffalo	24.00 to 25.00
Chicago	34.00 to 34.50
Cincinnati	29.00 to 30.00
Eastern Pennsylvania	35.00 to 38.00
New York (dealers)	29.00 to 30.00
Pittsburgh	42.00 to 43.00
St. Louis	31.50 to 32.00

IRON RAILS

Buffalo	$23.00 to 23.50
Chicago	27.00 to 27.50
Cincinnati	20.00 to 20.50
Cleveland	22.00 to 23.00
St. Louis	23.00 to 23.50

PIPES AND FLUES

Chicago	20.00 to 20.50
Cincinnati	15.00 to 15.50
Cleveland	22.00 to 22.50
St. Louis	16.50 to 17.00

RAILROAD GRATE BARS

Buffalo	$22.00 to 23.00
Chicago	24.50 to 25.00
Cleveland	22.00 to 23.00
Eastern Pennsylvania	22.00 to 23.00
New York (dealers)	19.00 to 19.50
St. Louis	22.00 to 22.50

FORGE FLASHINGS

Boston (dealers)	17.00 to 18.00
Chicago, small	19.00 to 19.50
Cleveland, small	21.00 to 22.00
Cleveland, large	21.00 to 22.00
Detroit (dealers)	18.00 to 18.50

FORGE SCRAP

Boston (dealers)	14.50 to 15.00
Chicago	23.50 to 24.00
Eastern Pennsylvania	22.00 to 23.00

ARCH BARS AND TRANSOMS

Chicago	29.50 to 30.00
St. Louis	27.50 to 28.00

ANGLE BARS—IRON

Chicago	30.00 to 30.50
St. Louis	27.50 to 28.00

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	16.00 to 17.00
Buffalo	23.00 to 24.00
Chicago	20.50 to 21.00
Cleveland	22.00 to 23.50
Eastern Pennsylvania	22.00 to 23.00
Pittsburgh	23.50 to 24.00
St. Louis	18.50 to 19.00

STEEL CAR AXLES

Birmingham	27.00 to 28.00
Boston (dealers)	27.00 to 28.00
Buffalo	24.50 to 25.50
Chicago	28.50 to 29.00
Cleveland	31.00 to 32.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	23.00 to 24.00
Pittsburgh	31.00 to 32.00
St. Louis	27.50 to 28.00

SHAFTING

Boston (dealers)	27.00 to 28.00
Chicago	28.00 to 28.50
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	21.50 to 22.50
St Louis	24.75 to 25.25

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	22.00 to 23.00
Birmingham iron	21.50 to 22.50
Boston (consumers)	24.00 to 24.50
Buffalo, iron	26.00 to 27.00
Chicago, iron	29.00 to 29.50
Cincinnati	22.00 to 22.50
Eastern Pennsylvania, cupola	27.00 to 28.00
New York iron (dealers)	23.50 to 24.00
Pittsburgh, iron	29.50 to 30.00
Pittsburgh, steel	30.50 to 31.00
St. Louis, iron	29.00 to 29.50

NO. 1 CAST SCRAP

Birmingham, cupola	$23.00 to 24.00
Boston (consumers)	26.00 to 27.00
Buffalo	27.50 to 28.50
Chicago, cupola	29.00 to 29.50
Cincinnati, No. 1, machinery, cupola (net ton)	23.00 to 23.50
Cleveland, cupola	28.00 to 28.50
Detroit (net ton) (dealers)	23.00 to 24.00
Eastern Pennsylvania, cupola	28.50 to 30.00
New York, cupola (dealers)	23.00 to 23.50
Pittsburgh, cupola	29.50 to 30.00
San Francisco	26.00 to 27.00
St. Louis, agricultural	27.50 to 28.00
St. Louis, railroad	27.50 to 28.00
Valleys	23.00 to 24.00

HEAVY CAST

Boston (consumers)	25.00 to 26.00
Buffalo	21.50 to 22.00
Cleveland	21.00 to 22.00
Detroit automobile (net ton)	27.00 to 28.00
Eastern Pennsylvania	26.00 to 27.00
New York (dealers)	21.50 to 22.50
Pittsburgh	25.50 to 26.00

MALLEABLE

Boston (railroad)	25.00 to 26.00
Buffalo	27.00 to 28.50
Chicago, railroad	29.50 to 30.00
Chicago, agricultural	29.50 to 30.00
Cincinnati, agricultural	22.00 to 22.50
Cincinnati, railroad	23.00 to 23.50
Cleveland, agricultural	26.50 to 27.00
Cleveland, railroad, nominal	28.00 to 28.50
Detroit (dealers)	24.00 to 25.00
Eastern Pennsylvania, railroad	22.00 to 23.00
Pittsburgh, railroad	28.00 to 29.00
St. Louis, agricultural	25.00 to 25.50
St. Louis, railroad	25.00 to 25.50

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	22.50 to 23.00
Boston (dealers)	20.00 to 21.00
Chicago	25.50 to 26.00
Cleveland	27.00 to 28.00
Eastern Pennsylvania	26.00 to 28.00
New York (dealers)	20.50 to 21.00
Pittsburgh district	29.50 to 30.00
St. Louis	23.75 to 24.25

LOCOMOTIVE TIRES

Chicago	27.00 to 27.50
St. Louis	26.75 to 27.25

LOW PHOSPHORUS PUNCHINGS

Chicago	26.50 to 27.00
Eastern Pennsylvania	26.00 to 28.00
Pittsburgh	31.00 to 32.00

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Double Ram Hydraulic

Scrap-Metal Presses

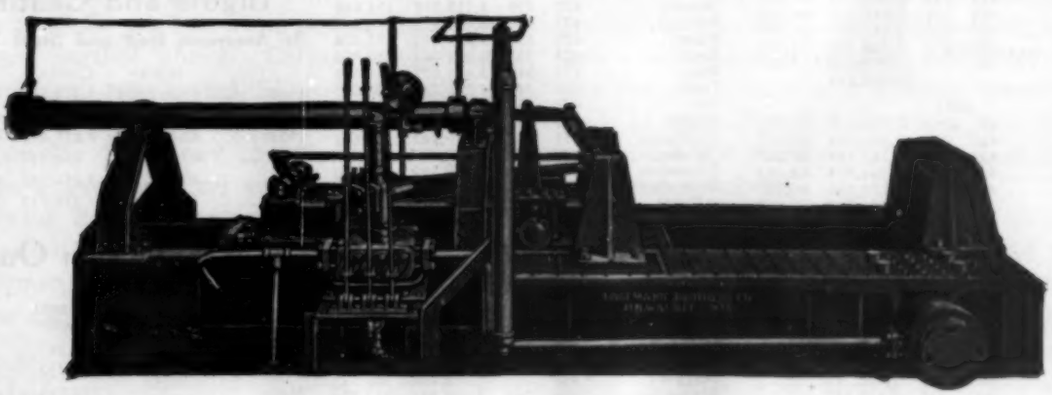
STANDARD

In Hundreds of Mills, Yards and Plants

Hydraulic-compressed scrap always commands the best prices. It is more conveniently stored—more economically handled—there is less loss from corrosion—less heat is required for remelting.

Loose Scrap is worth almost nothing.
Compare this with prices paid for "hydraulic-compressed."

LOGEMANN BROTHERS CO., 3126 Burleigh St. MILWAUKEE, WIS.



We build Balers for All Purposes

Hand-balers for waste-paper, power and hydraulic balers for the textile trades, hydraulic presses for metal and waste trades.

Also Hydraulic Shaft Straighteners, Etc.

Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	Stacks No.	Stacks In	Output Total	Output Av. daily
1907				
January	376	311	2,174,801	69,509
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,299,732	
1908				
January	398	139	1,081,813	34,316
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,680,140	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,186
October	413	309	2,589,681	84,001
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,337,002	
1910				
January	416	311	2,399,995	83,871
February	417	311	2,429,525	86,747
March	417	310	2,588,736	83,580
April	418	291	2,477,700	82,590
May	421	206	1,871,388	60,367
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,793	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,192
Total			26,840,314	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,867
April	421	220	2,044,904	68,163
May	421	206	1,871,388	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	421	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,287,800	89,929
February	423	306	2,778,670	92,095
March	423	278	2,562,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,716,825	90,865
June	422	283	2,816,883	87,229
July	422	264	2,658,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,594,098	83,137
October	425	244	2,439,924	81,933
November	424	225	2,529,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	355	3,238,970	104,483
September	431	344	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,794
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,602
Total			38,437,488	
1919				
January	435	330	3,306,279	106,634
February	435	311	2,943,347	105,270
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,168
September	434	317	3,124,308	104,173
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,927,088	68,906
March	436	103	1,593,542	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,857
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	240	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	
1923				
January	428	261	3,228,226	104,136
February	424	278	2,989,819	106,779

Ingots and Castings

By American Iron and Steel Institute

	Ingots	Castings	Total
1916	41,401,917	1,371,763	42,773,680
1917	43,619,200	1,441,407	45,060,607
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797

Monthly Ingot Output

1922	Gross Tons 87.5 per cent of capacity	Indicated total
January	1,593,482	1,820,000
February	1,745,022	1,995,000
March	2,370,751	2,710,000
April	2,444,513	2,800,000
May	2,711,141	3,100,000
June	2,634,477	3,010,000
July	2,487,104	2,840,000
August	2,214,582	2,530,000
September	2,373,779	2,710,000
October	2,872,415	3,280,000
November	2,889,297	3,300,000
December	2,779,890	3,175,000
Total	29,116,453	33,270,000
1923		
January	3,251,694	3,720,000
February	2,919,017	3,330,000